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ABSTRACT

This literature review is divided into two main sections. The first part identifies key dimensions of the policy debate that will condition future patterns of investment in education. The themes chosen are the impact of recession, the effects of debt and structural adjustment programs on the resources available for education; the implications of demographic trends in developing countries; technological change and changing patterns of employment and livelihoods; the continued degradation of the global environment; the new priorities attached to human rights and good government; and the importance of gender issues in education and development. The second part provides and up-to-date culling of the research literature relating to seven specific fields. These fields are: (1) education and economic development issues; (2) school effectiveness and student achievement; (3) technical and vocational education; (4) the balance of investment between educational levels; (5) private educational expenditure and cost recovery programs; (6) organizational reforms, assessment practices and alternate delivery strategies; and (7) literacy programs. (Contains 234 references.) (Author)

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EDUCATION RESEARCH

EDUCATION AND DEVELOPMENT
THE ISSUES
AND
THE EVIDENCE

Serial No. 6

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EDUCATION RESEARCH

EDUCATION AND DEVELOPMENT
THE ISSUES
AND
THE EVIDENCE

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University of Sussex

Serial No. 6
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Overseas Development Administration

PREAMBLE

The material for this review was first gathered as part of a report "Dialogue for Development: A Policy Review of British Educational Aid Towards 2000" which was submitted to the Overseas Development Administration in mid 1992. Those parts of the work which discuss general issues in education and development and collate recent research findings are presented here so that the work may reach a wider audience.

This review falls into two main sections. The first part[1] identifies key dimensions of the policy debate that will condition future patterns of investment in education. The themes chosen are the impact of recession, the effects of debt and structural adjustment programmes on the resources available for education; the implications of demographic trends in developing countries; technological change and changing patterns of employment and livelihoods; the continued degradation of the global environment; the new priorities attached to human rights and good government; and the importance of gender issues in education and development.

The second part provides an up to date culling of the research literature relating to seven specific fields. These are education and economic development issues; school effectiveness and student achievement; technical and vocational education; the balance of investment between educational levels; private educational expenditure and cost recovery programmes; organisational reforms, assessment practices and alternative delivery strategies; and literacy programmes.

The discussion of the school effectiveness literature has been extended by David Pennycuick in his related review published in this series. Angus Ross assisted in collecting material for this study, in developing the section on literacy, and in refining its presentation.

This review has made use of a wide range of the most recent source material drawn from the Institute of Development Studies library. I am grateful to the assistance of many colleagues at the IDS, in the University of Sussex, and in the ODA who drew my attention to relevant studies. This work was completed before the recent World Symposium on the Economics of Education sponsored by the ODA, British Council, the World Bank and the GTZ which was held at Manchester in April 1993. The papers from this conference extend some of the analysis and arguments presented here.

Keith Lewin

Hove 2nd June 1993

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[1] an abridged version of this part of the material will appear in Oxford Studies in Comparative Education, Vol 3(2) 1994

OVERSEAS DEVELOPMENT ADMINISTRATION

OCCASIONAL PAPERS ON EDUCATION

This is one of a number of Occasional Papers issued from time to time by the Education Division of the Overseas Development Administration. Each paper represents a study or piece of commissioned research on some aspect of education and training in developing countries. Most of the studies were undertaken in order to provide informed judgements from which policy decisions could be drawn, but in each case it has become apparent that the material produced would be of interest to a wider audience, particularly but not exclusively those whose work focuses on developing countries.

Each paper is numbered serially, and further copies can be obtained through the ODA's Education Division, 94 Victoria Street, London SW1E 5JL, subject to availability.

Although these papers are issued by the ODA, the views expressed in them are entirely those of the authors and do not necessarily represent the ODA's own policies or views. Any discussion of their content should therefore be addressed to the authors and not to the ODA.

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1. EDUCATION AND DEVELOPMENT - DEFINING THE ISSUES

1.1. Context

In the early 1990's the ODA bilateral programme was disbursing over a billion pounds annually of which about 10% was classified as educational aid. Educational aid is therefore a major component of British assistance to development, particularly when it is remembered that these figures exclude multi-lateral contributions and educational aspects of projects predominantly located in other sectors.

The significance of human resource development supported by education and training is manifest. It contributes to medium term institution building, is an essential complement to many investments in physical infrastructure, and is an integral part of any definition of development that sees access to educational services of appropriate quality as a basic human right. In order to improve the planning of educational assistance it is necessary to take a view on some of the major factors that will shape educational development over the next decade. These are discussed below after an introduction to some recent trends which map the terrain over which these factors operate.

The social and economic environment in which development is taking place has been changing rapidly. The 1980's have been characterised by increased differentiation between developing countries in their human development status. The experience of the last three decades has been used by UNDP to classify countries into three groups - those where sustained human development has taken place (e.g. Botswana, Costa Rica, the Republic of Korea, Malaysia and Shri Lanka), those where human development has been disrupted (e.g. Chile, China, Colombia, Jamaica, Kenya and Zimbabwe), and those where opportunities for human development have been missed (e.g. Brazil, Nigeria and Pakistan) (UNDP 1990:42). This differentiation is the result of the interaction of a wide range of factors which include political instability, economic mismanagement, widespread recession, falling commodity prices, rising interest rates and levels of indebtedness, and increased distributional skews.

Global patterns of investment in education are complex and there are many choices in how to analyse them. UNESCO data yields Table 1 which shows how public expenditure as a proportion of GNP has been changing.

Table 1. Public Expenditure on Education 1970-88

	Percentage of GNP			
	1975	1980	1985	1988
World Total	5.8	5.5	5.6	5.5
Developing countries	3.6	3.8	4.0	4.1
Sub-Saharan Africa	3.8	4.9	4.3	4.5
Arab States	5.9	4.4	6.0	6.4
Latin America and Caribbean	3.6	3.9	4.0	4.4
East Asia and Oceania	2.3	2.7	3.2	2.9
South Asia	3.0	4.0	3.4	3.6
LDCs	2.6	3.1	3.3	3.3
Developed Countries	6.4	6.0	6.0	5.8

Source: UNESCO 1991::36 Table 2.9

This indicates that in general proportional allocations averaged across regions have remained fairly stable. Those in Sub-Saharan Africa, which includes a disproportionate number of countries where GNP growth has been minimal, experienced a significant decline in the mid 1980's but there has been some subsequent recovery. Alongside this pattern the proportion of the national budget allocated to education in many developing countries appears to have been falling. Two recent analyses indicate that the proportions of central government expenditure allocated to education in the developing countries on which there is data (about 35), show a fall in more than twice as many cases as there have been increases over the period 1972-1982 and 1972 - 1986 (Lewin 1987:56, Hallak 1990:27). The proportions allocated to health have also declined more often than they have increased. In countries with primary gross enrolment ratios (GERs) below 90 in 1986 more than half (13 out of 21) experienced a decline in the proportion of central government expenditure on education over the last five years on which there were data (Colclough with Lewin Table 2.1 1993) Eight of these countries are in Sub Saharan Africa.

If this partial picture is complemented by data on expenditure per student some finer resolution of the consequences of the changed climate for educational investment becomes possible. Table 2 shows expenditures in US$ and in units of GNP per capita in the main regions.

Table 2: Public Current Expenditure per Pupil by Level of Education 1970-88.

	Year	All levels		First Level		Second Level		1st & 2nd Levels		Third Level	
		US$	Units	US$	Units	US$	Units	US$	Units	US$	Units
All Developing Countries [72]	1975	49	0.15					33	0.10		
	1980	106	0.17					73	0.12		
	1988	129	0.18					93	0.13		
Sub-Saharan Africa [26]	1975	101	0.44	49	0.21	251	1.09	75	0.33	2675	10.7
	1980	133	0.32	70	0.17	296	0.72	101	0.24	3521	8.5
	1988	89	0.31	50	0.17	175	0.61	70	0.24	1549	5.4
Arab States [11]	1975	140	0.21					105	0.16	633	0.9
	1980	227	0.16					174	0.13	1019	0.7
	1988	313	0.19					240	0.15	1467	0.9
Latin America Caribbean[25]	1975	166	0.15	81	0.07	196	0.18	100	0.09	694	0.6
	1980	328	0.14	164	0.07	326	0.14	195	0.09	1286	0.6
	1988	293	0.15	163	0.09	246	0.13	180	0.09	863	0.5
East Asia Oceania [8]	1975	19	0.09					17	0.08	353	1.6
	1980	46	0.11					36	0.09	538	1.3
	1988	73	0.13	43	0.08	89	0.16	55	0.10	446	0.8
South Asia [5]	1975	32	0.17	17	0.09	34	0.18	21	0.11	116	0.6
	1980	83	0.24	50	0.15	96	0.28	63	0.19	195	0.6
	1988	110	0.19	69	0.12	123	0.21	86	0.15	445	0.8
LDCs [19]	1975	34	0.23	18	0.12	55	0.38	25	0.17	513	3.5
	1980	50	0.24	26	0.13	90	0.44	36	0.18	858	4.2
	1988	45	0.22	25	0.12	86	0.43	35	0.17	422	2.1
Developed Countries [31]	1975	1098	0.24					834	0.18	2637	0.6
	1980	1862	0.21					1417	0.18	4019	0.5
	1988	2888	0.24					1983	0.16	6520	0.5

Note: Units refer to units of GNP per capita; numbers in parentheses in column 1 refer to the number of countnes.
Source: UNESCO 1991:98 Table r9.

Sub-Saharan African countries have seen total expenditure per pupil drop by fully one third in US$ terms between 1980 and 1988, with smaller declines in Latin America and the Caribbean (11%). In other regions expenditure per pupil in US$ has increased - by as much as 38% in the Arab countries, and by 55% in the developed countries over the same period. A contrasting picture emerges if expenditure is accounted for in units based on GNP per capita. These figures indicate that countries in Sub-Saharan Africa allocate greater proportions of GNP per capita to education than is the case in other regions. The relative economic burden of increasing access to education in these countries is therefore greater than elsewhere since a larger proportion of GNP has to be allocated to enrol additional students. This is a particularly acute issue in those African countries where GNP growth has been sluggish or negative.

The most recent figures suggest that gross enrolment rates (GERs) at the first level have fallen in Sub-Saharan Africa as a whole from 77% in 1980, to 71% in 1985 and to 67% in 1990. In all other regions GERs have increased, though the rate of increase slowed in the second part of the last decade. Regional GERs also remained below 100 in the Arab States and in South Asia. GERs actually declined in 16 of the 37 countries which had GERs of less than 90 in 1986 over the six year period 1980-86 (Colclough with Lewin 1993: Table 2.1). Twelve of these countries were in Sub-Saharan Africa. Analysis of enrolment growth by level shows a slowing at all levels in all regions during the 1980's, a consistent tendency for growth rates to be higher at secondary and tertiary, and again Sub-Saharan Africa experiencing some of the greatest declines in growth (Table 3). Estimates of the grade 4 survival rates of a cohort entering grade 1 in 1988 indicate that 67% survive in Sub-Saharan Africa, 91% in the Arab States, 78% in East Asia and Oceania, 55% in Latin America and the Caribbean, and 63% in South Asia (UNESCO 1991:31). This illustrates that large numbers fail to complete four grades even in those regions where mean GERs for primary exceed 100. GERs, it should be remembered, underestimate net enrolment rates, sometimes very substantially. Where repetition is high and overage entry common the differences may be 20% or more suggesting that internal efficiency is low and that many remain unschooled.

Disparities in enrolment rates between girls and boys remain striking. In Sub-Saharan Africa in 1990 there were 23% more boys than girls at the first level, 35% more at the second level, 180% more at the third level. The Arab States (24%, 34%, 64%) and South Asia (34%, 70%, 128%) had similar patterns (UNESCO 1991:53, Table 3.2). All but one of the countries with a GER of less than 90 in 1986 had smaller female enrolments at the first level, with an unweighted average value of 68% of male enrolment (Colclough with Lewin 1993:Table 2.1). The weighted mean for all low income countries for females as a percentage of total enrolments is 43% (Lockheed and Verspoor 1990:169).

Table 3 Enrolment Growth Rates by Level of Education 1970-88 (Percentages) and GER (First Level)

	Years	First	Second	Third	GER
	Level	Level	Level	Level 1	
All Developing Countrie	1970-5	5.3	7.7	11.9	92.8
	1975-80	2.2	5.7	7.1	94.9
	1980-88	1.1	3.1	4.5	98.1
Sub Saharan Africa	1970-5	7.4	14.3	13.3	58.1
	1975-80	9.4	14.4	14.0	77.1
	1980-88	1.8	4.3	8.1	66.7
Arab States	1970-5	5.7	10.2	15.1	73.1
	1975-80	4.4	8.8	10.4	79.9
	1980-88	4.0	5.9	5.6	83.4
Latin America	1970-5	5.1	3.4	17.3	97.0
Caribbean	1975-80	2.9	6.9	6.0	104.8
	1980-88	1.5	3.7	4.7	109.3
EasternAsia	1970-5	6.9	11.7	11.4	113.2
Oceania	1975-80	0.6	5.2	15.5	109.7
	1980-88	0.8	0.7	7.3	119.9
South Asia	1970-5	3.6	4.6	9.5	75.8
	1975-80	2.2	4.6	3.5	77.0
	1980-88	3.5	6.0	1.1	88.4
Least Developed Countries	1970-5	7.7	8.3	8.3	
	1975-80	5.4	5.0	11.1	
	1980-88	3.5	4.5	6.8	

Note First level GERs are for 1975, 1980 and 1990 (projected).
Source: UNESCO 1991 Tables 2.4, 2.5)

Literacy rates have been increasing and in most developing countries literacy amongst 15-19 year olds is greater than in the adult population as a whole suggesting this trend will continue. However in Sub Saharan Africa (47%), the Arab States (51%) and South Asia (46%) adult literacy is still low. Illiteracy is concentrated amongst women - in the least developed countries adult literacy rates for women are 28% compared to 51% for men (UNESCO 1991:26). India and China account for about 53% of adult illiterates and about 21% of the remaining illiterates are concentrated in eight developing countries. Current projections suggest that the absolute number of adult illiterates is likely to fall but by only about 1% by the end of the century (UNESCO 1991:25)

The trends selectively reviewed above present donors with a sharply differing set of education and development issues in different countries. In some regions - notably Sub-Saharan Africa - and in particular countries dispersed across the regions, a stagnation or decline has occurred in enrolment ratios at primary level and proportions of GNP and of the national budget allocated to education have fallen. In many of these cases there are other signs of distress. Individual examples are not difficult to find where salaries of

teachers have diminished substantially in real terms below levels necessary to provide a livelihood, non-salary expenditure has been squeezed to derisory levels, and evidence from achievement studies suggests that standards have declined. By contrast, many countries which have not suffered economic deprivation have been able to consolidate first level enrolment gains, often to near universal levels, and direct concerted attention towards other aspects of educational improvement, most notably increasing achievement and improving quality at primary and subsequent levels.

1.2. Recession, Debt and Structural Adjustment

A common proposition advanced to explain why educational expenditure has been falling in particular countries is to argue that it has been "crowded out" by other pressing demands on government budgets (Noss 1991:23). Escalating debt and defence spending are most commonly cited as responsible. Levels of debt have indeed been increasing (thirteen fold from 1970 to 1990 (UNDP 1992:45) albeit that only 20 countries are responsible for nearly 60% of this debt. In Sub-Saharan Africa debt is comparable in magnitude to the annual GNP of all the countries together and the IMF alone was receiving net transfers of 0.7 US$ billion a year from these countries between 1986 and 1990 (UNDP 1992:46). Debt servicing represented 25% (weighted mean) of the value of exports in 1990 and nearly 83% of GNP per capita amongst low income economies as a whole (World Bank 1992:264 Table 24). The debt burden on developing countries continues to siphon off as much as US$170 billion a year ((UNDP 1991:79). Relatively small concessions or debt swaps for human resource development could therefore have a major impact on national budgetary allocations in a number of the most indebted countries.

By contrast global military spending is falling after a long period of rapid growth as the cold war comes to an end. In both developed and developing countries military expenditure appears to have been shrinking at about 3% a year potentially releasing large amounts of resources for other purposes. Unfortunately this trend is not yet observable in many of the poorest countries in Asia and Sub-Saharan Africa (UNDP 1992:85) and it has not been uncommon to find that military expenditure has been rising much faster than the national budget as a whole. There remain very wide disparities in the relationships between military and social sector expenditure - in some states military expenditure is between two and five times social sector spending (e.g. Somalia, Nicaragua, Ethiopia, Pakistan). In others it may be less than one fifth (e.g. Botswana, Ghana, Mexico and Costa Rica). The ratio of soldiers to teachers varies over a similar range (UNDP 1992:87). Paradoxically countries that spend a lot on the military (more than 4% of GNP) receive approximately twice as much Official Development Assistance per capita as those that are low spending (less than 2% GNP) (UNDP 1992:44).

Some defence spending is of course fully justified. More than 30 developing countries were involved in armed conflicts in the late 1980's with the effects often spreading well beyond their borders. In those countries most severely affected there are likely to have been substantial negative effects on GDP growth and on the level of non-defence related public sector spending. A recent study argues that 21 out of 53 African states have experienced war as one of the largest factors in suppressing economic growth, comparable only to the effects of decline in the terms of trade. This has resulted in a decline in GDP growth regionally from a probable 5-6% to an actual 2-3% (i.e. below the average rate of population growth, representing a per capita reduction in GDP in many cases (Green 1991)).

However, low allocations of expenditure on primary education do not seem to be simply linked to relatively high levels of indebtedness or defence spending (Colclough with Lewin 1993:18). The mean value of defence spending as a proportion of GNP in those developing countries with primary gross enrolment ratios (GERs) of less than 90 and GNP per capita of less than US$2000 in 1986 was substantially lower than the mean for all developing countries with GNP per capita below US$ 2000. And the levels of indebtedness of those countries with GERs below 90 were similar to the mean for all countries in the group.

Thus, though the proposition that high levels of debt servicing and defence spending are related to lower levels of educational investment is plausible, it appears that the chain of causality is more complex than a simple linear relationship. It remains consistent to argue that, in particular cases, the problem of insufficient resources for education may indeed result from excessive allocations to the military beyond reasonable need, and/or levels of indebtedness that reduce the resources available to governments to levels insufficient to allow effective implementation of educational development policy.

There has been a considerable debate on the extent to which structural adjustment programmes have contributed to diminutions in social sector spending in general and for education in particular, and whether "Adjustment with a Human Face" (Cornia, Jolly and Stewart 1987) - a response to concerns with the impact of structural adjustment programmes on social welfare - has led to some protection for investment in social sector programmes.

Structural adjustment programmes are broadly intended to support the ordered transition of economies experiencing changed external conditions (oil price shocks, high interest rates, exchange rate fluctuations, deteriorating terms of trade etc.) to new points of budgetary equilibria and to create the conditions for economic growth. About 70 countries had received over 200 adjustment loans by the end of 1990.

Recently the balance has shifted in favour of adjust-

ment loans targeted on particular sectors. Most of the loans were to low income countries in Sub Saharan Africa and to highly indebted middle income countries. The policy conditionality associated with most of these loans carries four main implications for educational investment. Public sector recurrent and capital spending is usually constrained to reduce budget deficits. Wage restraint and public sector establishment rationalisation is usually required of public services. Reductions in public subsidies and the recovery of costs are encouraged. Most recently social policy conditionalities have been introduced into to attempt to protect the most vulnerable groups from the impact of adjustment policies (Noss 1991:2).

Recent contributors to the debate on the impact of structural adjustment include Stewart (1991a), Noss (1991), and Sahn (1992) and contributions to special issues of the IDS Bulletin (1989 Vol 20 Nol) and World Development (1991 Vol 19 No 12). Stewart argues that adjustment policies have not had the desired effects of restoring economic growth and that the balance of the experience was "undoubtedly negative (Stewart 1991b:1848). In both Latin America and Sub Saharan Africa per capita income and investment declined and inflation accelerated. Moreover, although there was a variety of experience among adjusting countries, on balance government per capita spending declined. As a result social sector spending per capita declined by 26% in Africa and 18% in Latin America between 1980 and 1985. In a sample of 34 countries 60% of those which received structural adjustment loans experienced declines in educational expenditure per capita, whilst the majority of those that did not receive such loans experienced increases (Kakwani, Makonnen and Van der Gaag 1989).

There is some evidence that primary education expenditure as a whole may have been protected in some Sub Saharan African countries. Its share of total educational spending appears to have increased more frequently than it decreased (Berstecher and Carr-Hill 1990) but, where population growth was high, per capita expenditure may still have been falling. Partly as a result of cost recovery strategies being pursued, parental expenditure per primary school child appears to have increased in some countries to reach 7-20% of GNP per capita in Zambia, Mali, Sierra Leone and Togo (Jespersen 1991).

More generally Stewart argues that in many countries stabilisation and adjustment policies in combination with other factors have had an adverse impact on the poorest slowing and sometimes reversing progress in educational development. Thus in the first period of adjustment in the Philippines poverty increased substantially and educational expenditure per child fell significantly. Despite this it seems that some countries have succeeded in combining adjustment, growth and social progress (e.g. Indonesia) and others have been able to sustain social progress during a period of adjustment in the absence of much growth (e.g. Chile).

Noss's comprehensive review of the impact of adjustment on education details the analytic problems which make it difficult to reach simple conclusions and cites a recent UNDP report which argues that "problems of data and methodology have thus far been so severe as to preclude any systematic evaluation of the social impacts of adjustment programmes" (Chapelier and Tabatabai 1989). However, this has not prevented many from trying. As early as 1984 Hicks and Kubisch explored the effects of consecutive year reductions in government expenditure on social sector spending in 37 countries and concluded that it suffered less than other sectors. They noted large differences between cases in their sample and recognised the limits of its representativeness. This analysis suffers from being insensitive to longer term and cumulative effects that may result from reduced government expenditure under conditions of austerity and adjustment (Lewin 1987:57) - social sector spending is likely to be difficult to reduce rapidly since it is concentrated in salaries, the effects of adjustment may only become apparent in the medium term as salaries are eroded by inflation and fewer new staff are hired.

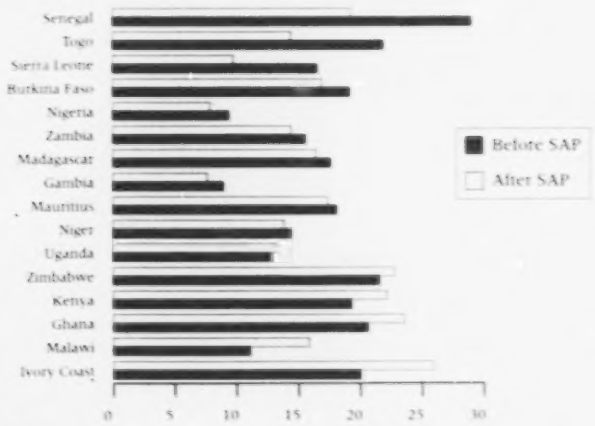
Vulnerability coefficients (the ratio of percentage change in educations share to percentage change in total government expenditure) can be used to indicate whether education is more or less protected than other sectors. For Guinea this coefficient was 0.64 between 1986 and 1989 (real educational spending fell by 25% but the government budget fell by 40% and education was relatively protected); by contrast for Malawi over the period 1982-88 it was 5.5 (government spending fell by 3.3% but educational spending fell by 17.4% and education appears to have been more vulnerable than other sectors). Cornia, Jolly and Stewart (1987) present data suggesting that during recession education has suffered more than other sectors and is therefore more vulnerable though this study uses data that pre-date most structural adjustment programmes.

Amongst the recent studies reviewed by Noss (1991) on the impact of adjustment on education Gallagher (1990) has compared allocations to education amongst fiscally distressed (adjusting) and other (non-adjusting) developing countries and Sahn has explored changes in the share of education of the government budget before and after the first World Bank adjustment loans. Neither are able establish systematic effects though Gallagher concludes that reductions in social sector spending are associated with slower economic growth. Conversely Kakwani, Makonnen and Gaag (1990) and a recent World Bank study (World Bank 1990) associate adjustment directly with declining resources: these studies suggest the share of the public budget and GDP allocated to education increased in all country groups after 1980 except those that experienced intense adjustment.

In a later paper Sahn (1992) restates his argument that there is no pattern of increase or decrease in real levels

of social sector spending before and after adjustment. This study is based on unweighted country statistics of a sample of 22 Sub Saharan African countries in the 1980's; it fails to support predictions of widespread negative effects of adjustment. It appears to demonstrate that educational expenditures increased after structural adjustment as a percentage of discretionary government expenditure in 6 cases (e.g. Ghana increased from 20.5% to 23%, Kenya from 19.3% to 21.7%) and fell in 10 (e.g. Sierra Leone 16.6% to 9.9%, Nigeria 9.4% to 7.4%). In about half the cases the changes were very small. Real expenditures per child may have behaved very differently to this especially where significant devaluation has occurred (Nigeria, Ghana, Sierra Leone) and where relationships between total government expenditure and total government discretionary expenditure have varied, to name just two complicating factors. Sahn (1992) concludes by suggesting that there is no compelling evidence that structural adjustment of itself worsens provision of social services; rather deterioration is a chronic problem in failing economies which are those most likely to require adjustment programmes. Noss (1991) also takes the view that though there is correlation between adjustment programmes and reductions in public expenditure - and thus social sector provision - causal relationships are poorly understood and analysis is extremely complex.

Figure 1: Educational Expenditure Before and After Structural Adjustment



Education Expenditure as % of Total Discretionary Government Expenditure
Source: based on data in Sahn [1992:Table 7, p 686]

The ideas of Adjustment with a Human Face developed in the mid 1980's were designed to protect vulnerable groups from the adverse effects of adjustment. In summary (Van der Hoeven 1991) these consisted of including in the adjustment process:

> more expansionary macroeconomic policies aim at sustaining levels of output, investment, and human needs satisfaction over the adjustment period:
>
> sectoral policies aimed at restructuring within the productive sector to strengthen employment and income-generating activities and raise productivity amongst low-income groups:
>
> the use of mesopolicies on taxation, government expenditure, foreign exchange and credit to influence the distribution of income and resources:
> improvements in the equity and efficiency of social sector expenditure through public expenditure restructuring:
>
> compensatory programs to protect basic health and nutrition of low-income groups;
>
> monitoring of living standards, health and nutrition:
>
> integrating adjustment policies with longer term visions which take into account economic, human, sociological and ecological contexts.

Though these ideas have begun to appear more frequently in the discussion of adjustment programmes and attempts have been made in some cases to incorporate them, progress in this direction appears to have been slow. Stewart (1991b:1861) judges that though acknowledgement of the importance of protecting the poorest groups is evident in recent negotiations there is little evidence that macro-economic policies of international financial institutions have been modified with this in mind. What modifications there have been, have tended to be add-ons which are marginal to the main thrust of policy. Reductions in food subsidies, the introduction of user charges, and price decontrol remain central features of most adjustment programmes, and these have not been complemented with adequate safeguards for the poorest.

Planning for austerity and under conditions of adjustment is unlikely to be simply the opposite of planning for growth. There are a range of organisational, procedural, political and psychological reasons why this is so (Lewin 1987:88). The consequences of austerity and of adjustment programmes designed to restructure public spending to accommodate new conditions can be broadly classified into seven propositions. These are:

> Pressure to reduce public sector spending as a whole increases, with serious consequences for social sector and education spending since this is one of the largest single budgetary items in many countries.
>
> Reallocation of expenditure within the education sector to favour salary recurrent expenditure at the expense of non-salary recurrent and capital spending occurs in both planned and unplanned ways.
> Reallocation between educational levels (primary, secondary, tertiary) takes place for reasons of budgetary expediency as much as a rational response to planned needs and devel-

opmental benefits.

Concentration of government support on formal rather than non-formal educational spending increases.

Emphasis grows on cost reducing reforms, which act to reduce the unit costs per child, and is reflected in increased pupil teacher ratios and declining salaries.

Greater stress is placed on cost recovery schemes and more private financing to reduce public expenditure on education.

Short term considerations and budgetary constraints are overemphasised at the expense of medium and long term concerns in decision making.

The dimensions of these different but inter-related possible outcomes have been explored in some detail in Lewin (1987:54-87). As might be expected, evidence that one or more of these tendencies has accompanied economic austerity programmes is not difficult to find for specific countries over a particular time scale. Thus, as is reported above, the vulnerability of educational spending in some countries has been high (Noss 1991:24). Capital expenditure has declined in many of the poorest developing countries with an increasing amount financed by donors; non-salary recurrent expenditure has also declined, often to derisory levels (Lewin with Berstecher 1989:60). Higher education appears to have been relatively protected in some cases - in Costa Rica between 1980 and 1986 primary allocations fell to 65% of their 1980 value and those for higher education to only 90% (Noss 1991:28). Data on non-formal expenditures by governments are notoriously difficult to obtain. There are however very few examples where ministries of education under financial stress appear have explicitly increased their commitment in this area. Salary levels of teachers have fallen widely, especially in Africa (Tibi 1990). Cost recovery schemes, which include the levying of fees, voluntary contributions and encouragement of private schooling are widespread with many consequences for equity (Lewin with Berstecher 1989:63-71). And "cultures of cuts" in public sector organisations, with the various symptoms of crisis management, are not unrelated to the emergence of good government as a development priority in many countries as administrative capacity decays.

Charting the mechanisms through which such changes come about is far more difficult than demonstrating the existence of trends in particular countries which are consistent with the propositions. This is because many factors will be specific to the social and economic conditions of each country, and the impact of adjustment programmes will depend on the nature of the adjustment that is planned, and the details of how it is implemented. And not all the tendencies identified necessarily have adverse consequences for development. For example, whether shifts towards or away from higher education support are developmentally desirable will depend at a minimum on what the existing balance is, the ratio of unit costs at different levels, the efficiency of different types of institution, and the strength of demand for educationally qualified staff at different levels.

Stewart (1991b:1849) may be right to argue that it is inappropriate to adopt a "conterfactual approach to assessments of the impact of changes associated with austerity and adjustment (where actual developments are compared with what might have happened if no adjustment had taken place) since, from the point of view of effects on human conditions, it is actual developments that are significant. If deterioration has occurred, development has not taken place. If changes of the types listed have taken place, and where these have not widened access, increased efficiency, and maintained educational quality, there is a prima facie case for assistance that might lessen the deleterious impact of such changes.

One way of approaching this set of problems raised by austerity and adjustment for educational investment and international assistance is to explore educational policy options that can respond to austerity which consciously seek to minimise effects which erode the quantity and quality of educational investment. Work initiated for the World Conference on Education for All (Colclough and Lewin 1990) has been extended to provide a new analysis how this might be achieved. An operational definition of basic education provision is used that allows for the achievement of Gross Enrolment Rates of 100% and substantial reductions in drop-out rates and repetition. Policy reforms are applied which are cost saving, cost shifting and quality enhancing. These include various measures concerned with double shifting, class size, community assistance, higher education subsidies, expenditure on learning materials, teachers salaries, and repetition and drop out. In summary, using both aggregated and individual country level simulations, this work demonstrates that through selective use of educational reforms many countries could finance more efficient educational systems with broader access and improvements designed to enhance quality, without allocating disproportionate amounts of public resources to education. Reformed, relatively efficient systems with GERs of 100 or more, which allow for real improvements in the resources available to improve quality (e.g. for educational materials and for real increases in teacher's salaries) can be no more demanding on the public budget than expanded but inefficient systems without quality enhancements (Colclough with Lewin 1993) .

The implications for educational assistance of the various trends outlined above are complex and many dimensioned. It is not simply the case that countries which do not succeed in providing adequate education to most of their populations are resource constrained in so doing. In some failure to achieve this is the result

of conscious decisions to allocate resources for other purposes whether these be military, excessive levels of borrowing to sustain levels of public expenditure, or other preferred uses of public funds. This one issue stands out above all others in relation to the policy dialogue between donors and recipients. To what extent is failure to provide adequate access to educational services a function of resource constraints, cost constraints or relative neglect? This bears directly on the question of whether aid can contribute to improvements in those countries where many experience little or no access to schools and other educational services.

Some assessments therefore have to be made of the conviction with which educational development policy has been pursued and of the constraints which apply. A more detailed analysis of this problem is provided in Colclough with Lewin (1993) as it relates to educational investment at the first level. This illustrates how assessments can begin to be made. In principle this analysis suggests the value of examining public sector budgets in terms of levels of expenditure on education as a percentage of GNP, and expenditures per student as a percentage of GNP per capita. These can then be associated with the enrolment ratios achieved to judge an implied level of commitment to education and begin to indicate policy priorities. It can help distinguish cases that are resource constrained (where a relatively high proportion of GNP is already allocated) from those that are cost constrained (where unit costs at primary are a relatively high proportion of GNP per capita), and from those that may be both. The case for external assistance may be strongest where resources are constrained. Cost constraints imply the need for cost reducing reforms which may also benefit from some types of external assistance directed towards this end. Where neither resources nor costs are constrained the case for assistance is weakest since restricted access is evidently a reflection of domestic priorities which then becomes an issue to be taken up in the policy dialogue.

The final point to stress is that in the medium term most of the costs, at least at primary and secondary level will remain recurrent and relate directly to teachers' salaries. The problems of improving access to schooling and enhancing its quality are inescapably recurrent in nature and this adds a dimension to the debate concerning appropriate assistance. Donors have been unwilling to commit themselves to recurrent support since it seems to represent a potentially open ended commitment with a lower level of accountability than does capital and project aid. Where the basic costs of financing education are capable of domestic financing, as they are in most middle and upper income developing countries given appropriate political will, this is probably a sound policy. In low income countries, especially those with high population growth rates, low economic growth, and considerable unsatisfied demand for education amongst the poorest groups, the situation is more complex. Excessive emphasis on capital projects builds up recurrent burdens that may not be sustainable and compromises the effectiveness of the assistance that is given. Project aid with a very large capital element may therefore exacerbate deficits in recurrent finance which will not resolve themselves.

There is therefore a compelling case for considering general forms of recurrent budgetary support alongside more conventional capital aid and project assistance in those countries which are both committed to educational development and demonstrably incapable of financing its provision. This need not be an open ended commitment in so far as it can be phased in and out over negotiated time scales. Neither need it be any less accountable than other types of assistance if an appropriate policy dialogue occurs which agrees the conditions under which it might be provided. Without support of this kind in some countries aid may indeed result in perverse effects which undermine the capacity to deliver general educational services to the majority of the population equitably. This may occur both because of increasing and unsustainable burdens on recurrent expenditure which result from an accumulation of aid financed projects over time, and because such projects may attract critical staff and resources away from the national government and deplete the capacity for efficient educational administration of the system as a whole.

In conclusion, what pertains in particular countries is a product of a combination of the willingness to support education in competition with other sectors and the ability to do so, especially where austerity has become a recurrent feature of public expenditure bargaining (Lewin 1987). Where there is evidence of low proportional allocations the temptation is to conclude that the first task is to transform the policy making environment so that espoused priorities are reflected in actual allocations. The only exceptions will be where there really are irreducible forward commitments that prevent this. Even in these cases the two most commonly cited obstacles - debt servicing and defence needs - are open to scrutiny to see whether there really is room to manoeuvre. Where costs are high relative to countries at comparable levels of economic development, and this is responsible for limited access, the opportunity exists to explore the extent to which efficiency reforms could reduce unit costs and allow greater access.

1.3. Population Growth and Demographic Change.

Five major issues related to population influence the magnitude and quality of the educational development assistance problem. These are concerned with population growth, the related issues of fertility and child health, the impact of increasing levels of HIV infection, urbanisation, and the movements of displaced peoples and refugees.

1.3.1. Population Growth

Population growth remains the single most important factor in determining the long term growth of demand for educational services. It is intimately linked with the problems of providing adequate resources to meet expanded demand. Put simply in countries where the growth rate of the school age group exceeds the rate of economic growth it is clear that, ceteris paribus, larger and larger proportions of central government expenditure will have to be allocated to financing education to maintain current enrolment ratios. Without these increases, the expenditure per student will have to decline with probable consequences for the quality of what can be delivered and the access that can be provided to educational services. Improving levels of expenditure per student from their widely inadequate existing levels implies a concomitantly greater financial burden.

Population growth rates for the 6-11 year old population in low income countries projected to the year 2000 have a weighted mean of 2.7% excluding China and India (Lockheed and Verspoor 1990:165). For Sub-Saharan Africa the weighted mean is 3.3% (World Bank 1988:158). If the school age population grows at 3.3% annually it will increase by 50% in about 12 years and double in 20 years. School age dependency rates (the number of 6-14 year olds compared to the 15-64 year old population) have generally been declining and now average about 33% across all developing countries. Sub Saharan Africa still has an increasing ratio which is approaching 50%, implying that there are only two adults per school age child potentially available for employment. This has obvious implications for the resources available to support the education system. It also implies that a significant proportion of working age literate adults would have to become teachers if teacher pupil ratios are to be kept within reasonable bounds - as many as one in forty according to a recent estimate (UNESCO 1991:22).

In those countries with low population growth rates the problems of financing education systems are much less severe than elsewhere. An example is China which has achieved high participation rates partly as a result of favourable demographic changes without an excessive increase in the financing required (Lewin with Coldough 1993:Chapter 3). Overall population growth rates have fallen from 2.2% (1965-80) to 1.2% (1980-87) and are projected to remain at this low level into the next century (World Bank 1989a:214). More particularly the rate of growth of the 6-11 year old age group declined from 3.3% (1965-75) to 0.6% (1975-80). From 1980-85 the age group actually contracted at a rate of -3.9% (Lockheed and Verspoor 1990:165). This contraction is a direct result of family planning and the one child policy. The 6-11 year old age group is now expected to grow at only 0.8% for the rest of the decade.

The effects of demographic changes are still working their way through. If the projections of population growth made by the World Bank in 1984 (World Bank 1984:Table 3.3) became a reality the number of 7-12 year olds in China would reduce by 50 million between 1983 and 2000 (from 144 million to 94 million) and there would be a decline in total primary enrolments by 42 million. This would enable a gross enrolment ratio of 100 to be achieved with 70% less school places than were available in 1983. In fact the school age population has shrunk more slowly than anticipated in the early 1980's. A more recent projection (Lockheed and Verspoor 1990:165) suggests that the 6-11 year old population will recover from a low of 122 million in 1985 to 137 million by the year 2000 - this is however comparable with the total number of school places provided in 1983. Even modest economic growth could therefore ensure rising levels of expenditure per student.

In another recent analysis we have modelled the effects of falling population growth on educational costs. A simulation model based on data derived from Sub-Saharan African education systems was constructed (Colclough with Lewin 1993:Chapter 5). In the basic model population growth was assumed as 3.3%, the weighted mean for the region. Initially the model was used to show the costs of increasing primary GERs from their current value (69.5) to 100 by the year 2000 and maintaining them at this level until 2005. Primary recurrent costs increase by 100% in 2000 and by 137% by 2005. Reducing population growth lowers these costs to 71% and 87% of their 1990 values respectively potentially releasing more resources for improvements in quality. Significant reductions in the costs of secondary begin to appear after 2000 as the reduced cohort moves through the simulated system. In this model the proportion of the government recurrent budget that would need to be allocated to education in 2005 reduces by about 15% as a result of slower population growth. These effects are cumulative and ultimately, when the model returns to equilibrium, costs will grow at the new rate of population growth.

Reductions in population growth rate therefore ease the financial burdens of increased access to education and improve school age dependency rates. In those countries with very high growth rates and much lower expectations of economic growth, improving access to schools and preventing reductions in the per student expenditure on education are only likely to be possible if population growth rates moderate.

1.3.2 Fertility and Health

Population growth rates are closely related to fertility rates on the one hand and child survival rates on the other. A considerable body of research suggests that it is the education of females that has one of the strongest impacts on family size and on the nutritional and health status of children. More educated mothers tend to have smaller families, at least above certain thresholds of educational level (Cochrane 1979, Birdsall 1988). Claims that a secondary education for females reduces the average number of children from 7 to 3 (World Bank 1992:8) may be over optimistic but

the direction of the association is no longer disputed. It may be that the conventional economic explanation stands up to analysis - that more educated women pay off higher child quality with child quantity recognising the opportunity costs of increased family size on quality, and are more efficient users of contraceptives and more productive in ensuring the quality of their siblings. This narrow view does not seem sufficient to explain the wide variety of forms that the association between maternal education and smaller family size appears to take. It is also noted elsewhere that there is an established relationship between enrolment disparities between boy and girls and overall low enrolment ratios. Closing this gap, by enrolling more girls, would potentially have the double benefit of increasing participation for what is in many countries one of the most educational underprivileged groups, and subsequently reducing the rate of growth of the school age population. These issues are discussed further in the section below on the education of girls and women.

Changes in the health status of children also have an impact on the number of school age children in ways which are likely to be complex. If more children survive the size of the age cohort will increase and if morbidity diminishes school attendance rates are likely to improve. Greater survival rates may encourage some parents to have fewer children. Which effect is dominant will depend on the interaction of several factors - cultural, economic, access to family planning etc.

The greatest causes of death amongst children remain a relatively small number of preventable diseases and conditions. These are dehydration, pneumonia, tetanus, measles, and whooping cough. These five conditions will account for two thirds of all child deaths and over half of child malnutrition in the 1990's (UNICEF 1990:16). Low cost vaccines, oral rehydration therapy, and antibiotics could prevent the majority of these deaths. The technology to achieve this is widely available at reasonable cost levels. The problems are those of political commitment, access to primary health care, the provision of assistance to ease the flow of vaccines and drugs, and of education. Ignorance of simple procedures is responsible for far too many preventable cases of death and malnutrition. Oral rehydration requires no expensive ingredients, no instruments to administer, and only basic knowledge of procedure - yet it has been estimated that 2.5 million deaths occurred which could have been prevented by using ORT in 1988. Similarly much malnutrition is preventable if basic health information is widely disseminated and mothers are aware of the signs and causes. UNICEF (1990:30) reports studies which estimate that the rate of child malnutrition could be more than halved by the widespread use of simple procedures and knowledge of good practices over the next decade. The impact of malnutrition of growth and achievement is reviewed in Pollitt's (1990) recent book. The provision of basic health information, which also encourages hygienic living conditions and awareness of nutritional requirements, are central to educational development directed at poverty alleviation and the relief of unnecessary suffering.

1.3.3. Increasing HIV Infection

A growing but as yet unquantified threat to public health, which may have a substantial impact on population growth, arises from the spread of the HIV virus and the subsequent development of AIDS. The number of HIV seropositive cases identified appears to be rising substantially in those countries worst affected. This presents a major challenge for educational development. A brief summary of recent research is available in the Institute of Development Studies research review Insights (Spring 1992).

If the worst prognostications prove well founded mortality rates will continue to rise both amongst 1-5 year olds infected by their parents, and amongst the most at risk groups - 15-40 year old adults. The latter is particularly critical since it is this population that is the most economically active and it is from this population that the majority of teachers in most countries are drawn. Significant increases in mortality in this group will increase the school age dependence ratio, making it much more difficult to finance educational services, will deplete the often inadequate teaching force available, and reduce the working lifetime of teachers trained at considerable cost. The Economist Intelligence Unit speculates in a Zambian study that AIDS will cause a steady increase in the incidence of breakdowns, accidents, delays and misjudgements, and output will suffer. The danger is that skilled workers, supervisors and managers will die of AIDS faster than replacements can be trained (Southern African Economist 1992:19). One Bank has already lost 55 skilled personnel since 1989 and has been forced to close some branches as a result. Some employers are now screening workers and reconsidering their education and training programmes. In Zimbabwe, where the average length of service of skilled workers with a particular company is thought to be about three years, attempts are being made to resist employment discrimination against workers carrying the virus. Many of those infected will have a productive working life that extends beyond the length of time in any particular job.

The full implications of the spread of HIV have yet to be established and there continues to be much uncertainty as to how the disease will develop and what effects it will have on population growth and health status. If mortality rates do reach the levels of the most pessimistic predictions the working age population may be decimated and the social fabric of societies severely damaged. A recent prognosis suggests that population growth rates could decline by between 1% and 2% as a result of increased adult and child mortality and a consequent decline in life expectancy (Anderson et al 1991) . Seroprevalence rates vary widely from country to country and reliable data which might provide a comprehensive picture is largely absent. Reported rates of seroprevalence amongst pregnant urban women who have been

tested range from 5% to 20% or more in Sub-Saharan Africa, amongst sex workers figures as high as 70% to 80% have been found in some populations (de Bruyn 1992:249). In some central African capitals 50% of the admissions to hospitals are now aids related (World Bank 1991).

African HIV infection occurs heterosexually. Patterns of infection vary but it appears to be most common for seroprevalence rates to be greater amongst 15-29 year old females than males, with the opposite trend amongst 30-50 year olds. In Tanzania the majority of known cases of HIV are amongst women and about a quarter of those who were pregnant and infected gave birth to infected children. About 30% of women attending ante-natal clinics in Lusaka carry the virus. In Angola child mortality is estimated to increase by 17% by the year 2000 as a result of AIDS. Women are responsible for about 70% of the agricultural production in rural areas and the burden of caring for sick children may result in declining food production. Estimates from Zambia suggest that there may be as many as 600,000 orphans by the year 2000. In Sub Saharan Africa as a whole the figure may be as high as 5 to 10 million orphans, with a further 10 million children infected with AIDS by their parents (Southern African Economist 1992). The direct costs of treatment have been estimated to range from 36% to 200% of GNP per capita (Southern African Economist 1992:4). These are substantial, especially in countries which have seen spending on health decline, and place an unsustainable burden on public health systems as the numbers infected grow.

Many countries are now introducing sex education into schools. Extensive efforts are being made to provide information on safe practices both through sex education in schools, through the primary health care system and through the efforts of NGO's in circulating free educational materials. In Zimbabwe, Zambia and Botswana Action magazine is widely available and carries health and environmental stories in comic strip form to wide audiences (see for example Action Magazine No 8). This magazine is supported by grants from ODA, SIDA, the Zimbabwe Trust and the Gabarone Round Table. Redd Barna amongst others sponsors a schools HIV/AIDS education programme which has produced over 400,000 booklets for students and teachers, a range of posters and other learning materials, has sponsored over 60 in-service training workshops, and has assisted in the incorporation of information on HIV into the school curriculum. An evaluation report (Marangwanda 1991) indicates that most of these programme objectives have been achieved. In an extensive survey of educational administrators, parents and adolescents Dzvimbo and Schatz (1992) have traced knowledge about and attitudes towards sex education directed partly towards HIV awareness and intended to lead to behavioural changes. Their data illustrates how complex and varied reactions are to the introduction of these matters into the school curriculum. Views of educational administrators, parents and students were at variance with each other and within the groups there were differences associated with different types of school - mission, district authority etc. Wilson, Greenspan and Wilson (1989) illustrate that despite campaigns to provide information misconceptions remain prevalent amongst secondary school students in Zimbabwe. More than 40% of their sample believed that most people with AIDS in Africa were homosexual, that HIV seropositive individuals look unhealthy and that HIV can be contracted from toilet seats and mosquitoes.

In other regions, many countries are introducing HIV related content into school curricula. To give only one example amongst many, the Community School Board in Papua New Guinea has now agreed that sex education should now be part of upper primary curriculum with the support of the Council of Churches who were previously unenthusiastic. This is a result of growing concern both with population growth and with sexually transmitted diseases (Education Now 1991:6).

A pervasive problem for educational programmes designed to promote low risk sexual behaviour is that whilst it is relatively easy to show that informational messages are being received, there is little firm evidence on the extent to which this alters risk behaviours. The analytical problems are formidable, and, in such a sensitive area, data is often inaccessible and unreliable. The analytical problems are similar to those involved in studying other risk behaviour. Recent modelling of risk assessments related to cigarette smoking identifies three sources of information that influence perception of risk. First there are prior risk assessments that individuals have derived from general attitudes and prejudices, second there are risk assessments based on direct experience and that of significant others around them, and third there are risk assessments that are influenced by information deliberately provided by educational and health organisations. It is the last element that educational campaigns may influence.

As far as smoking is concerned there is some evidence that government campaigns can influence the perception of risk in voluntary health related behaviours. Studies of smoking seem to indicate that young people are more influenced by campaigns and more likely to over estimate risks than are comparable older individuals. This is thought to be because direct and indirect experience indicates to older individuals levels of true risk, whilst information on the adverse effects of smoking is usually unquantified but implied to be very risky (Viscusi 1991). The analytic problem becomes most acute when attempts are made to link perception of risk to actual decisions on whether to smoke. In these there often appears not to be a direct or high correlation between perceived level of risk and actual behaviour. This has part of its explanation in different dispositions to risk avoidance. Some individuals are highly risk averse, with low levels of risk influencing behaviour. Others, whose perception of risk is the same, are more inclined to accept the risk. Few studies

in developing countries appear to have tried to apply risk analysis to safe sexual behaviour perhaps unsurprisingly given the difficulties in collecting data on private behaviour in areas which are often culturally very sensitive.

Whilst there appears no effective antidote, and treatment is relatively costly, educational programmes targeted at reducing behaviour thought to increase risk are an obvious option. Much is already being done in providing information packages, developing curriculum materials, and training teachers in how to introduce the topic. Evidence on the effectiveness of these efforts is beginning to emerge which indicates that messages on safe sexual practice do get across, though not necessarily to all members of target groups. It is argued in the literature that HIV prevention is a gender issue since seroprevalence rates tend to be much higher amongst certain groups of young women, the responsibilities of care for AIDS patients often fall on women, and the role of women in child care means that their health is especially important in continued reductions in child mortality and reducing the number of orphaned children (Bassett and Mhloyi 1991, de Bruyn 1992). There is therefore a case to place special emphasis on the education of girls and women about risk patterns and safe practices, alongside efforts to encourage men to be more well informed and adopt patterns of behaviour which reduce the spread of HIV.

The role donors can play in these efforts must be approached very carefully. In many societies human sexual behaviour is not regarded as a legitimate field with which governments or donors should concern themselves. Assistance for AIDS/HIV educational programmes depends on it being possible to agree on appropriate relationships which are mutually beneficial.

1.3.4. Urbanisation

Urbanisation in the developing world is changing the nature of the educational challenge that confronts developing countries. In 1991 a majority (48%) of the populations of medium human development countries lived in urban areas (excluding China). Only in the lowest human development countries were rural populations predominant (71% excluding India) (UNDP 1992:136). Poverty is endemic in many of these urban areas and is often comparable to that in rural areas. Table 4 shows how urban populations are likely to grow.

It is striking that cities often produce high proportions of countries GDP. Estimates made in the early 1980's suggested that Lima in Peru, with 27% of total population was responsible for 43% of GDP Manila with 13% of the population accounted for 33%, Lagos with 5% of the population produced 57% of the value added by manufacturing, and Port Au Prince in Haiti with 14% of the population generated 40% of national income (UNDP 1990:86). These figures may have overstated the importance of cities to national economies since much rural production may not be traded. However since these estimates were made urbanisation has continued rapidly and the economic polarisation implied by these estimates has probably increased. In 1960 there were only three cities with a population of more than 10 million in the developing world, by 2000 there are likely to be at least 18. There were only 9 cities with a population of more than 4 million in 1960 in the developing world, by 2000 there are likely to be 50 (UNDP 1990:86).

Table 4 Rate of Increase in Urban Population 1985-2000

	Urban Population			
	1985	**2000**	**Increase**	**%Increase**
Africa	174	361	187	108
Asia	700	1187	487	70
Latin America	279	417	138	49
Oceania	1.3	2.3	1	77
Developing Countries	1154	1967	813	70
Industrial Countries	844	950	106	13
World	1998	2917	919	46

Source: UNDP 1990:87 Table 5.1

Both because urbanisation means that increasing proportions of the population are urban and because many of these urban dwellers are poor, shifts are implied by urbanisation in patterns educational assistance targeted on poverty alleviation. These shifts are not only of a quantitative kind. Urban environments are different to rural environments; employment opportunities have a different quality, and different types of educational provision may be thought relevant.

1.3.5. Displaced Populations and Refugees

Displaced populations have been growing. In the Sudan, in Southern Africa, and in parts of South East Asia there are substantial flows of people driven by war, drought and famine to seek safer and more tolerable living conditions. For example more than 400,000 refugees are estimated to be in makeshift camps in Kenya coming from the surrounding countries at rates of anything up to 1000 an hour (Sunday Times 7.6.92:22), and there are almost certainly more than ten million displaced persons throughout Africa. These populations, and others like them, represent some of the most marginalised and educationally underprivileged groups whose prospects are the most bleak. The states in which they reside may or may not recognise their citizenship and are unlikely to place a high value on educational provision for either adults or children. As the numbers of refugees have grown so their social and economic characteristics have been changing. Most are now from rural, poorly educated and economically deprived backgrounds moving from one developing country to another through force of circumstance (Preston 1991). The need for emergency assistance to these groups is widely recognised. The politics of educational assistance are much more complex. The needs exist at several levels. Basic health and nutritional information is a priority to keep such populations as healthy as is feasible under difficult conditions. In some cases language and communication problems can only be solved if members of the displaced community acquire the language of their hosts.

Longer term resettlement programmes are likely to benefit from inputs that raise the educational status of these displaced populations and improve their employment prospects. It may be that because of the special characteristics of these groups, and because their status is often difficult to define, NGO's may be best placed to provide educational assistance.

1.4. Scientific and Technological Change

Technological changes have been a central feature of development strategies for the last three decades. They are becoming more rather than less important in defining the circumstances under which development will take place over the next decade. Technological change impinges on policy on educational assistance in many ways.

The capacity of scientific and technological advances to transform the physical environment and contribute to economic development is self evident. It is through technology that much of the investment that has taken place in human resource development has been transformed from ideas and possibilities to address the real world of needs to increase food production, improve access to clean water, generate power for industrial production, and provide infrastructure to market goods and services internally and for export. Advances in health care, communications technology, and transport systems have brought even the most remote areas into contact with the outside world and have provided access to the benefits of modern inventions.

At the same time these changes have brought with them some disadvantages and have contributed to the stresses associated with rapid change in any society. They have made possible urbanisation on an unprecedented scale and have transformed the nature of production, increased productivity and have reduced the needs for low cost labour for many types of industrial production and in commercial agriculture. They may have undermined culture and community in societies unprepared and vulnerable to rapid change. They may have contributed to the "cultural imperialism" that some observers associate with the marketing of consumer goods which purport to sell an (unavailable) lifestyle along with a product and with international television programming which projects images of affluence and conspicuous consumption into the remotest corners of the globe.

National science and technology policy, and its articulation with educational policy and educational assistance, take on a new significance against this background. Oversimplifying considerably there have been two distinctly different views of the role of science and technology in development. First there are those who see development as essentially a problem of technology transfer from industrialised countries to those with little scientific capability. This assumes developing countries can transform their economies by utilising science and technology developed elsewhere and follow broadly similar development trajectories. The key to this process is argued to be to ensure that technology is transferred, not merely transplanted and that it is adapted to suit local conditions. Problems to be overcome include the ownership of intellectual property rights, the commercial value of production technology, the different mix of factors of production in different environments, and the scarcity of qualified scientists and engineers. With goodwill and some measure of disinterest on the part of the owners of technology, technological dependence can then be replaced by technological cooperation that vests some measure of control with organisations in the host country. This may be easier to achieve with obsolescent technologies and may be increasingly difficult the closer the technology is to that of leading exponents who would suffer competitive disadvantages by making the technology available to others.

An alternative perspective is to stress the qualitative differences in the development problems of the poorer countries and argue for the development of indigenous and appropriate science and technology that cannot come about simply through technology transfer no matter how efficient. Proponents of this view note that the research and development which is concentrated in developed countries is often simply irrelevant to the needs of rural populations where even the simplest technology cannot be maintained and capital is much scarcer than labour. They point to the tardiness and underfunding of research on tropical agriculture and diseases as an example of how the development priorities of rich countries have shaped the impact of science and technology on developing countries. Much of the agricultural research that has been applied they argue, is directed towards improving the production of cash crops for export, not meeting the basic needs of the local population. And medical research has focused on the diseases of the rich rather than those of the poor. From this perspective the need is for those who can create and radically adapt scientific and technological knowledge for domestic application, not simply transfer it. They can then contribute to scientific and technological development domestically and internationally. Technological dependency can then be replaced by a judicious mix of appropriate and indigenously developed science and technology which is grounded directly in the needs of the populations it serves.

The world is never as simple as the common habit of constructing dichotomies suggests. Both views contain elements of truth and paint incomplete pictures. This is partly because the problems of development have both local and international dimensions and because science is in a sense universal (it seeks knowledge which is not bound by specific cultural contexts) but the utility of its application (technology) is specific to context. National science and technology strategies based on these different views demand an understanding of the room to manoeuvre that national economies have. Small countries with limited access to markets cannot hope to sustain a wide base of technological industries. Even medium and large size

countries are unlikely to have the resources to compete globally in most fields. The only strategy that is really viable is to identify affordable technologies where there is a comparative advantage. The corollary of this is to emphasise the scientific and technological needs of the population as a whole, and make special provision to support science and technology in carefully selected areas. For a good proportion of developing countries it will remain much cheaper to buy specialised training abroad than develop local facilities for which the demand will be limited and the costs high. The problem of ensuring that expensively trained staff do contribute the fruits of their training to the national economy that sponsors them, and do not simply brain drain themselves away, remains. But it is an illusion to believe that training in national institutions prevents this.

Policy on science and technology has to address competing priorities. These may include an orientation to initiatives which contribute to national economic growth based on capturing part of global markets for products with a significant science and technology component; lessening dependence on imported technology and meeting domestic ambitions to become more self sufficient, improving the employment prospects of the workforce through increasing knowledge and skill levels; enhancing the quality of life of the mass of the people through better understanding of their environment and how to make best use of it employing scientific understanding. Which of these is emphasised clearly has implications for the nature of science and technology education that can contribute to such policy objectives.

Thus appropriate assistance should reflect judgements of the nature of demand for scientific and technological skills. The kind of education and training that encourages the creative development of new products and develops them to a marketable form may not be the same as that which enables a systematic approach to be adopted to developing process innovations, or to maintaining equipment developed elsewhere. Academic science which emphasises the fundamental and is laboratory based may not encourage the development of the technological skills of solving problems in the real world that depend primarily on the identification and application of existing technologies. And similarly the appropriate mix of graduate level to technician and craftsmen who need scientific and technological understanding will depend in some measure on the structure of the local economy and the development strategy being pursued.

What the impact of changes in technology in the future will be is difficult to judge. New agricultural technologies may change the pattern of rural livelihoods. Increased urbanisation suggests that it is familiarity with urban applications of science and technology that is becoming more important for many citizens whose lives are increasingly divorced from rural areas. Scientifically based products and services are widely dispersed yet knowledge of their way they work is concentrated amongst a minority. This has many implications. Safe practices in the domestic use of electricity are widely disregarded through ignorance, many machines representing substantial capital investment cannot be repaired or are repaired in ways which provokes subsequent breakdown, corrosive and poisonous chemicals are released into the environment through ignorance as well as intention. Thus their exist growing needs for both specialised assistance to increase the pool of technically and scientifically competent personnel and for the extension of scientific literacy to a greater proportion of populations which depend on the benefits that they can deliver.

Carnoy (1992) has analysed the contribution that scientific and technological training can make to development in a series case studies which draw on Asian experience. He identifies four areas in which contributions may be critical. The first of these concerns changes in the world economic order which mean that more than ever before growth is dependent on knowledge and information which has a scientific character. Production in advanced countries, and those developing countries growing most rapidly is becoming increasingly related to the information processing technologies. Flexible, post-Fordist manufacturing strategies require technical competence and responsive innovation at the production unit level and intensify the sophisticated human resource inputs needed. It appears to be the case that those countries that have invested effectively in utilising information based technologies, and have the educational base to provide human resources to apply them, have reaped economic benefits as the high and sustained growth rates of the Asian Newly Industrialised Countries (NICs) suggest.

In most NICs the state has been developmentalist and has supported strategic planning and invested heavily in "catching up" technologies. This is the second area and is characterised by labour discipline, mass educational access, and special emphasis on science and technology in education and training and in public policy on development. The third and fourth areas identify the consolidation of institutional frameworks for research and training and the special role that higher education may play.

There may be lessons from the experience of Asian NICs for other countries, though, for the reasons identified above, some caution is needed in translating policy conclusions across economies and cultures. Castell's argument that acquiring new technology will only be effective if there is in the country a process of endogenous technological development that can receive, support and use the know how being transferred is convincing and lends support to the view that assistance to this end is a priority in those countries with the infrastructural conditions that make this a feasible objective. In conclusion there are four dimensions we can draw from a discussion of issues arising from scientific and technological change.

First, basic scientific and technological literacy is a prerequisite for adapting to changes in production technologies and consumption patterns that are affecting the populations of all countries. IEA and other data (see below) suggests that science is not taught effectively to large proportions of the school populations of many countries, and suggest that the needs of the majority, who usually follow non-specialised curricula offerings, are probably the most neglected.

Second, aspects of information technology, and other more traditional technologies, have an important place in science education. This has to be understood not in terms of naive introductions of, say, computer studies into schools where the costs are high and the educational benefits not clearly thought out. Rather it invites more systematic review of how awareness and skills with new and old technologies can most fruitfully be introduced to balance the virtues of the academic rigour of more traditional science courses.

Third, assistance in the development of national science policies is important where these do not exist. A clear view or purposes is a necessary condition for the translation of human resource development goals into science and technology education policy.

Fourth, specialised forms of science and technology education and training are at the core of the production of competent elites who can both act to negotiate effectively for the transfer of available and relevant technologies, and who can create a critical mass of scientific and technological capability which is endogenously based. The costs of developing this, and the appropriate role of external assistance in the process, bear close examination.

1.5 Environmental Degradation

Concern for the impact of development on national and global environments has been growing as evidence accumulates of changes in weather patterns and increases in pollution levels, and the sustainability of patterns of the use of natural resources is questioned. The United Nations Conference on Environment and Develop-ment in Rio de Janeiro has drawn particular attention to two issues - global warming and declining bio-diversity. There are many other issues which relate to environ-mental degradation. These include access to clean water, rising levels of air pollution and its consequences (e.g. acid rain, ozone depletion), excessive pesticide use and the consequences of the persistence of residues which contaminate food chains, disposal of solid wastes (both domestic and industrial) especially those that are hazardous, soil erosion, and deafforestation.

Most of these developments cannot be separated from the effects of high rates of population growth, which reduce the period over which adjustments can occur to changed patterns of land use, increased emissions and higher levels of consumption of products deleterious to the environment. The relationships between population growth and environmental degradation are not simple and can come in many forms. A recent analysis charts these and concludes "more people, short termist incentives, scarce land, and inadequate technical progress will validate the (environmental) degradation claim..." (Lipton 1991:221). This analysis goes on to argue that high real interest rates are a central part of the system of incentives which discourages more environmentally sympathetic development thus linking environmental problems to the relationships between developed and developing countries in which aid is a significant dimension.

Poverty, as well as economic growth, can be responsible for some kinds of increased environmental degradation. Over intensive land use using inappropriate technologies can hasten soil erosion, denude forest cover, pollute fresh water sources, and diminish indoor air quality through the burning of bio-mass. The initial stages of economic growth in poor economies often bring with them increased use of fossil fuels in vehicles and factories creating air pollution, urbanisation and changed consumption patterns which increase the volume of solid waste, and dense concentrations of populations consuming water that they cannot easily avoid polluting.

The most recent World Development Report argues that growth and greater levels of economic activity are not necessarily detrimental to environmental quality. In general higher income per capita is associated with better access to clean water and adequate sanitation. The concentration of particulate matter seems to first rise and then fall with per capita income as do urban concentrations of sulphur dioxide. On the other hand greater volumes of municipal waste and emissions of carbon dioxide are concomitants of increasing income. (World Bank 1992:11). The basic problem, from the World Bank's point of view, is to ensure that when decisions are made environmental costs are appropriately factored in and that the discount rate applied reflects the value placed on environmental quality. This may be easier said than done. It involves finding ways of including natural and environmental resources in national accounts, recording the depreciation of natural capital, including costing to "clean up" and restore assets (which is usually possible), and costing environmental damage (which is usually very difficult and not attempted) (Lutz and Munasinghe 1991:19).

There is a large literature characterised by advocacy rather than evidence on the desirability of environmental education programmes. Many countries have environmental science or environmental studies as curriculum offerings. In the majority these are not compulsory core subjects. In some this area provides a science option taken by students not academically able enough to follow pure science courses. In the development literature environmental issues appear to be more frequently cast in terms of economic and political concerns than educational ones (a recent special

issue of World Development on Environment and Development (20(4) 1992) does not include any contributions specifically on educational aspects). Where environmental courses exist in schools there is evidence that they succeed in conveying messages about the causes of environmental degradation to students, that the importance of environmental issues conservation, sustainable livelihoods etc. - is more widely appreciated, and that attitudes expressed by children display environmental concerns (e.g. Lewin and Bajah 1990).

There may be studies which can show effects that go beyond this to demonstrate that behaviours have changed on a significant scale in ways which are environmentally sympathetic but if there are they are not prominent in the literature. Showing such effects is bound to be difficult since the causes of environmental deterioration usually exist in a complex web of interactions between social, economic and political factors that interact and which are mostly not directly susceptible to the effects of environmental education. The importance of support for environmental programmes, within schools and more generally throughout communities most at risk from environmental hazards that are the result of human activities, is probably better regarded as a medium to long term priority. Effects are likely to appear as more people become aware of the consequences of unsustainable farming practices, unsafe water sources, diseases arising from environmentally damaging production technologies, and more conscious of quality of life concerns. Environmental education programmes might reasonably be thought to influence all of these things.

The dimensions of the environmental debate which bear on educational assistance appear to be three fold.

First, environmental impact cannot be ascertained or monitored without an adequate number of scientifically and technically competent staff capable of undertaking data collection and analysis. Without this ignorance and prejudice will inform discussion rather than an accurate understanding of emerging problems and options available to reduce adverse effects of development policies on the environment.

Second, information on environmental changes has to be available to those who consciously or inadvertently damage the quality of the environment through activities necessary for their livelihoods.

Third, since the effects of environmental damage are often long term rather than short term, and since some may prove effectively irreversible after a threshold has been passed, a sophisticated as well as an immediate understanding of the issues is needed amongst specialists and, as far as possible, in the population as a whole.

Educational assistance can provide support for all three of these developments. The training of scientists and technologists, and the provision of an infrastructure to allow them to operate, is critical. In many countries, and especially in the poorest neither the human development infrastructure nor the physical infrastructure exist to enable this to happen effectively. Without it, dependence on outside expertise is complete. In some cases this expertise may well be over influenced by the commercial concerns of production organisations whose first interests lie in servicing the interest on the capital they may invest and in making returns for shareholders. The availability of environmental impact information can be supported in several ways. Part of the problem is to ensure that regulatory authorities have the ability to project the results of data collection and analysis into the public domain. Where this is possible it can then be included in materials used in educational organisations to reach a wide audience. School books, university texts newspapers and popular books can all heighten awareness of environmental issues and develop awareness of the range of costs and benefits involved in choices that have to be made.

More freely available information is however not itself sufficient to result in more informed decision making. The specialised and general audiences have to have the educational tools to interpret information and the awareness to make reasoned judgements. This often presents awkward dilemmas - individual and local interests in competition with national ones; employment generation accompanied by an increase in occupationally related diseases; higher immediate costs of goods and services compensated by lower long term adverse environmental damage. Increasing educational participation, and the intellectual skills this imparts will not in itself solve these dilemmas. It may lead to perverse outcomes - for example where educated minorities are able to deflect environmentally unfriendly projects away from their own back yard to other less articulate communities. But there is little prospect that without the increased awareness that educational experiences can provide that more balanced judgements can be made that have the support of the majority of the population. Without this development policies are unlikely to be sustainable in the long term.

1.6. Good Government and Human Rights.

The relationships between good government in development assistance have come under new scrutiny. There are several reasons for this.

The dramatic events in Europe and the former Soviet Union have foreshadowed movements in many countries to replace one party state constitutions with those that allow elections and more democratic forms of government. The Latin American Summit in 1991 was attended by heads of state only one of which (Cuba) was not freely elected, representing a transformation from the situation a decade previously. Many African countries have taken the first steps towards multi party electoral systems (e.g. Zambia, Tanzania, the Seychelles) and more representative government

seems inevitable as events work their way through, even in South Africa. Civil unrest has affected some of those countries which have resisted the trend towards more democratic systems of government (Malawi, Kenya). The Chairman of the OAU is on record as calling for "the dismantling of all apparatus of unrepresentative power" and has suggested a deadline of the end of the century to achieve this (DAC 1991:31). In Asia elections have been held recently in Nepal, Mongolia and Bangladesh. This "wind of change," currently blowing most strongly in Africa, reflects widespread agreement on the need for greater participation of populations in political activity and more effective guarantees of basic human freedoms. As part of a new perspective on development many donors are taking the view that human freedoms are as much a part of development as is economic growth. The UNDP Human Development Reports illustrate these concerns. Moreover, it is increasingly seen as inconsistent, at the very least, for donors to suspend the values they place on human freedoms in their own countries when allocating development assistance. Thus the freedoms enshrined in the 30 articles of the UN Charter of Human Rights have become a legitimate concern of the policy dialogue process. UN monitoring of the preservation of these rights has attracted more attention and several NGOs, notably Amnesty International, have been very active in drawing attention to abuses.

There has been a growing concern that a proportion of development assistance has been mis-appropriated either directly through various forms of embezzlement, or indirectly through the substitution of donor resources to finance developments that would have been funded anyway, thus releasing funds for other activities - the so called fungibility problem. In extreme cases this has further impoverished countries when high placed officials have accumulated vast wealth at the expense of those they claim to serve. Cases have been publicised where personal fortunes appear to approach levels which are significant proportions of national indebtedness and where the source of the income, and the reasons for concealing it in secret bank accounts, are obscure. Repeated scandals related to commissions paid on large government contracts to officials and politicians out of proportion to legitimate services provided suggest another kind of malpractice. These kind of events have prompted UNDP to call for an Honesty International (UNDP 1992:89) that would draw attention to corrupt and fraudulent practices and publish information that would discourage large scale abuse of public funds.

Corruption and fraud are fortunately not characteristic of most development assistance. Where they are endemic they are likely to diminish the effectiveness of aid. But good government depends on far more than good intentions. It depends on good practices which are able to undertake effective management of public resources and deliver services according to publicly agreed policy in an efficient manner. Low motivation, poor accountability, inadequate record keeping, and underinvestment in infrastructure to support the machinery of government all contribute to poor governance. To the extent that this is deliberate, condoned, or merely convenient to those who have the responsibilities for using public funds this represents a serious problem which can compromise aid effectiveness. And to some degree it may be thought to exacerbate the conditions that educational assistance seeks to mitigate. Thus concern for good government has become an important feature of the policy dialogue between donors and host governments. Though it can be seen as undermining the sovereignty of national governments, since it questions internal administrative practice, it can also be presented as a problem where there is a common interest in a solution.

Measuring human freedoms is not an easy task. The indicators that can be used have to be widely understood and accepted. There is scope for much ambiguity when devising a new measurement scale outside familiar territory but a consensus is beginning to emerge. Personal security, the rule of law, freedom of expression, free participation in politics, and equal opportunity legislation are widely valued. Without them development will be impaired especially if these are considered part of the definition of development. It is not possible to establish a direct link between economic well being and such freedoms there are examples of autocratic regimes that deny most of these freedoms whose economies have grown substantially, equally there are many such regimes which have experienced economic decline. Foster (1987:99) argues that existing data do not establish an empirical base for pursuing educational policies based on the presumption that greater investment will necessarily lead to greater stability and more democratic forms of government whilst accepting the possibility that this may be so. The World Bank (1991) has put the case that more popular participation may enhance spending on social sector programmes. Damiba (1991) argues that there is a symbiotic relationship between democratisation of the political process and basic human rights and the capability of governments to successfully administer social and economic development programmes. And there are some signs that where autocracy and the suppression of human freedoms have been commonplace and yet economic development has occurred that increased affluence and economic well being has led to growing pressures for political reform.

An emerging consensus suggests that the development of civil society, reflecting the necessary and desirable cultural differences that exist between countries and groups, should be seen as an integral component of the development process. Without the institutions that this embodies, and the protection that these provide to the citizenry from arbitrary, autocratic or oligopolistic government which may degenerate into the fascism of the right or the left, it is difficult to defend a development strategy. Education, and the freer flow of information, are central elements in this process and this is where educational assistance has the most obvious

role to play. Literate citizens are better able to play a full role in civil affairs. The abilities of collating, analysing and interpreting information are skills encouraged by educational experience. Levels of awareness of both the immediate and more general context in which decisions have to be taken on development issues are also enhanced by the possession of higher levels of education. At a more specific level support for good government, the development of human rights and the democratisation of political systems has at least four elements. Economic reform is seen by some as a necessary pre-requisite with movement away from centrally planned economise towards market or market like systems of production and marketing of goods and services. These arguments are generally based on the presumption that economic growth is more likely, and human resources better used, in market economies where a bureaucratic state does not dominate. This obviously has ideological overtones as does the whole of this debate. An implication is that assistance predicated on this assumption has to recognise that adjustment from one economic system to another may not be simple and may require considerable support to cushion immediate effects on employment, the availability of basic commodities and on prices. Without some measure of assistance instability may be precipitated and ground painfully won to increase human freedoms rapidly lost. It may also imply changes in the character of education and training and therefore types of assistance that are appropriate.

Institution building is a second element without which good government in terms of efficient administration, and human rights guarantied by a legal system, are unlikely to flourish. Adequate education and health services are generally argued to be at the centre of institution building programmes which can provide human resources of sufficient quantity and quality to support the growth and consolidation of social and economic institutions. They also encourage and facilitate greater participation through increased literacy and numeracy, higher levels of development of cognitive skill, and more widespread access to access to labour markets that require educational qualifications.

Thirdly, some reform of the public sector may be implied. This may or may not involve changes in its relative size, with concomitant implications for employment in those countries where it consumes an inordinate share of the wealth generated by economic activity. It is likely to involve assistance to improve procedures, and introduce criteria for efficient performance into accountability systems at the departmental and individual level. As part of this improvement assistance for more reliable and valid assessment procedures may be appropriate. This applies both to the school system as a whole, where educational qualifications may be used to identify those likely to be interviewed for jobs, and to specific selection methods where bespoke selection instruments and procedures need to be developed. Civil service reform may also be justified where greater transparency is needed to safeguard public money and ensure that salary levels are sufficient to provide reasonable living standards (and thus discourage inefficient employment practices and petty corruption). It may also identify areas where services might be delivered more efficiently, with appropriate safeguards for equitable access, by parastatals or private sector organisations. Structural imbalance in public expenditure - over-expanded military budgets, excessive borrowing - may also be a legitimate item for discussion in the policy dialogue.

An emphasis on good government and the development of civil society necessarily implies greater concerns for the developmental status of marginalised and underprivileged sections of the community. This has been considered an increasingly appropriate matter of concern amongst donors. Though donor relationships are essentially government to government this has to be reconciled with individual donor priorities that, for example, place emphasis on poverty alleviation. Marginalised groups are, by definition, those that are likely to benefit least from developments in mainstream society. In different countries this embraces groups consciously or inadvertently overlooked by development assistance in the past. These may include ethnic minority groups, inhabitants of remote areas, nomadic peoples, women, and refugees and stateless people. It seems that as part of any new emphasis on good government as a factor in donor decision making the extent to which such groups are the focus of national development efforts should be a consideration. Such an orientation may have powerful support from research that shows that interventions can lead to direct gains on key indicators of development and poverty alleviation. This might apply, for example, to assistance targeted at improving levels of education amongst girls and women in those countries where opportunities are unevenly distributed (see below). In other cases, where it may be more difficult to show that assistance leads directly to economic and demographic benefits, the rationale for assistance may be more heavily dependent on the moral imperative of directing assistance to those in greatest need, with the poorest living conditions and the least prospects of improving them.

1.7 The Education of Girls and Women

The preceding analysis has drawn attention to several respects in which access to education amongst girls and women is inferior to that of boys and men in many, but not all, developing countries. There is a strong case, now widely recognised, that investing in the education of girls is a critical input for development and has a cluster of interrelating benefits. The general case that girls and women are relatively educationally deprived is easy to demonstrate. Female enrolments lag behind boys in most developing countries.

Table 5: Male and Female Gross Enrolment Ratios by Level of Education 1990 and Adult Literacy (percentages)

First Level		Second Level		Third Level		Adult Literacy	
M	F	M	F	M	F	M	F

Developing Countries	105.5	90.4	50.3	37.5	10.1	6.5	74.9	55.0
Sub Saharan Africa	73.5	59.9	21.2	13.8	2.8	1.0	59.0	36.1
Arab States	92.3	74.2	60.2	44.9	15.6	9.5	64.3	38.0
Latin America	111.4	107.2	55.7	59.6	19.3	18.2	86.4	83.0
Caribbean East Asia	124.6	114.9	58.7	47.7	7.3	4.9	85.7	66.4
Oceania South Asia	100.8	75.1	47.8	28.2	12.1	5.3	59.1	32.2

Source: UNESCO 1991:53 Table 3.2;:26, Table 2.2)

Though disparities in enrolments have been reducing at the first level they remain high in Sub-Saharan Africa, the Arab States, and South Asia. At the second and third levels progress towards more equal enrolment has been slower. Low enrolments are associated with lower GNP per capita and the association is stronger for countries with lower female enrolments (Behrman 1991:20).

There is a strong relationship between the incidence of low GERs at primary level and relative under-enrolment of girls. Countries where female enrolment is low are also countries where overall gross enrolment rates are low (UNESCO 1991:54). The bigger the disparity in enrolments between boys and girls the more likely it is that a smaller proportion of primary school children will be in school (Colclough with Lewin 1 993:Chapter 2) .

Drop out is higher for girls than for boys in the majority of African and Asian countries (UNESCO 1991:122 Table 5). Persistence rates to grade four are consistently lower for females in countries in Asia and the Near East (ANE) though the gender gap is less than that associated with enrolments. Enrolment rates for girls have been increasing faster than for boys in the ANE region. However there is some evidence that improvements in persistence have favoured boys rather than girls (Behrman 1991:8)

The proportion of teachers who are female has been increasing though in two regions they remain a minority at the primary level. In Sub Saharan Africa and South Asia females account for about 30% of all teachers at the first and second level. In all other regions half or more of teachers are women at the first level (UNESCO 1991:81).

Adult illiteracy is substantially higher for women than for men. In low human development countries, excluding India, the adult literacy rate has a mean of 59% for males and 34% for females. In the least developed countries the figures are 47% and 24% respectively and in Sub Saharan Africa the same pattern is apparent (56% to 34%). Of 59 low human development countries, fully 54 have male female disparities for literacy of 10% or greater. In only one, Lesotho, does female literacy exceed male (UNDP 1991:129).

Data from the IEA studies show that boys outperform girls in mathematics achievement at all ages in most countries. This is also the case in science subjects. The IEA Second International Science study demonstrates that sex differences greatly favoured boys in the countries with the lowest overall scores, in general and in terms of the performance of both the bottom 20% and the top 20%. Though in some high scoring countries sex differences were minimal (e.g. Hungary), in others (e.g. Japan), boys outperfommed girls consistently at all levels of ability. Typically sex differences in performance are greatest in physics and least in chemistry. Patterns do vary. It is not difficult to find studies where male scores are as much as half a standard deviation greater than for girls in lower secondary science (MSU 1986-1990). Analyses of O-level examination results for Kenya, Zambia and Botswana demonstrate that girls perform less well than boys in almost all subjects, but particularly in the physical sciences. In a small number of countries (e.g. Trinidad and Tobago) there seems some evidence that girls perform consistently better than boys in all types of schools and at all grade levels in science (Kutnick and Jules, 1988).

The reasons why female participation is characteristically lower than that for males have been enumerated in a recent research report (Brock 1991). They include factors, with differing emphases in different countries, that are geographical (the physical access to schools which often favours urban boys and discriminates against rural girls), cultural (the result of marriage practices, the gender stereotyping in economic roles, patriarchal social organisation), health related (preferential treatment of male children), economic (the opportunity costs of schooling girls), religious (disposition inherent in some religious practices), legal (asymmetric legal rights and ability to use the legal protection that is available), political and administrative (interest groups and implementation problems), and educational (especially where female teachers are scarce, and where investment in boys education is favoured).

The case in favour of increasing female participation has many dimensions, most obviously the simple observation that there is no equitable reason for the continued existence of under enrolment compared to boys. There are many other aspects to the case that illustrate that developmental benefits are available and that these probably accrue at a greater marginal rate than for boys where enrolment disparities are large. Early studies of the effects of female education on child health suggest that the impact of women's schooling is about twice that for men (Cochrane, Leslie, O'Hara 1980,1982). A complex picture is provided by later studies which take a wide range of approaches to controlling for possibly significant variables. In these there is no simple consensus about the size of the effects but some agreement about the direction. Mensch, Lentzner and Preston (1985) in a fifteen country study attribute considerable significance to mother's education in relation to child mortality. Rosenzweig and Schultz (1982) explored the determinants of male female survival in India in relation to expected rates of return in the labour market. No significant effects of parental schooling emerge in this study except that the difference in survival rates is less if fathers have matriculated (there is no effect for

mothers). Pitt and Rosenzweig (1985) report greater incidence of illness in Indonesian households the higher the head of household's education perhaps reflecting greater propensity to self report. The education of wives has no effect on reported frequency of illness. Boulier and Paqueo (1988) suggest that infant and child mortality in Shri Lanka is only reduced for mothers who have ten years or more of education and there is no effect for less education. There are many other studies (reviewed in Behrman 1991:67) and simple generalisations across countries and without specification of controls are elusive. Such controls include individual endowments (e.g. mother's height), community factors (good health care associated with higher levels of schooling), interactions between mothers and fathers schooling, and response biases in reported morbidity.

The direction of causality is also noted as problematic in some of the studies. There is evidence from Indonesia (Pitt and Rosenzweig (1990) that a one standard deviation increase in morbidity of siblings under four results in a 15% reduction in the number of teenage daughters whose primary activity is attending school. This suggests that raising attendance rates can be achieved by lowering child morbidity. In some countries, (e.g. Pakistan) gender gaps in enrolments, and achievement, seem most closely related to the nature of the public provision of schooling which provides more difficult access for girls (Alderman, Behrman, Ross and Sabot (1991).

Rates of return for females are at least as high as those for males, especially when controls are applied related to female participation in the labour force and participation in waged labour. In a number of studies it appears that rates of return for females are higher than for males at particular levels. Thus in Thailand (Schultz 1991) suggests a rate of return to secondary schooling of 25% compared to 13% for males. Gender gaps in paid employment may also contribute to reductions in the perceived benefits of schooling for girls despite the fact that rates of return for the education of girls may actually be higher for those who get access to the labour market. To the extent that this is true reductions in the gaps in both participation and wage rates should encourage more female schooling for longer. Schultz (1991) argues that increased schooling for women is warranted because it is generally associated with relatively high private rates of return, and relatively high social rates of return with significant externalities which include decreased child mortality and unwanted fertility, and more equitable social policy. The latter is the case because it increases the productivity of a marginalised group that is relatively poor, improves the inter-generational distribution of health and educational opportunities for children, and because it slows the population growth rate. Thus even if basic rates of return are comparable between boys and girls, the effects of these externalities will be to increase adjusted rates of return for females.

Behrman (1991:126) notes an element of caution that enters into Shultz's advocacy of the justification of special public subsidies to female education, but does not contest the basic thrust of the analysis offered. The analysis Behrman offers argues that there is a leap between recognising that there are externalities of the kind Schultz draws attention to and accepting the need for public subsidies. It is argued that it may be that this would be a second best solution - if the problem is contagious illness more effective immunisation may be a better strategy, if there are negative externalities to population growth over grazing, deforestation - appropriate pricing of such resources may be more effective. This seems to over look what may be strong interaction effects - effective immunisation programmes depend on the understanding and cooperation of mothers, family size is not simply determined by costs in the present and in the future.

Despite many technical reservations Behrman still concludes that allocation patterns for female education probably do justify a shift in resources (Behrman 1991:129). The analysis offered further notes that though it is sometimes claimed that the gender gap in schooling is less important than it appears because girls receive equivalent but informal educational inputs in the home and/or from other community based or religious organisations. This is difficult to demonstrate and there seem several contra-indicators. Available evidence supports the view that in most cases female formal education is associated with increased household production and increased non-market productivity. It also appears unlikely that home based education prepares girls better for the changing demands of developing societies than would a judicious mix of school and home based education. Much educational experience is likely to be unavailable in the home environment - if there are few books in the schools there are likely to be even less in the home; mothers, the main source of educational experience in homes in many cultures are likely to be less educated than fathers (and much less so than teachers) and more likely to be illiterate. Many skills can only be acquired by systematic practice which is not characteristic of much informal learning (numeracy, literacy etc.). If it were true that other forms of education apart from schooling were as effective it is difficult to understand why this should not be equally true for boys, a proposition that is rarely argued in debate of this kind.

King (1990) highlights some successful strategies that have been used in increasing female participation. School location has proved important in Bangladesh, Bhutan and Liberia in attracting and retaining more girls in school. Girls are less likely to travel beyond local catchment areas than boys so local provision is critical. Dormitories for girls have also been introduced where travel distances cannot be reduced. Providing a- secure environment for girls in school has also been influential in reassuring parents of the safety of girl children. Efforts to increase the proportion of female teachers have focused on local training and

posting teachers in schools close to teachers' homes. This has boosted the supply of female teachers in parts of Pakistan and Nepal. Financial incentives have been used in Guatemala to encourage continued enrolment and discourage early pregnancy. Bangladesh has also employed female scholarship programmes with a positive impact on enrolments - in the Sharastri Upazali area more than 20,000 girls benefited during the 1980's and female enrolments reached twice the national average. Community care schemes have been implemented in Colombia to free daughters of caring for siblings and domestic work and enable them to attend school. Improvements in technology can reduce the burden of domestic work that falls on girls and women - such that for example less fire wood needs to be collected. Flexible scheduling of classes can also provide opportunities to attend school outside the hours needed for basic economic activity. Adult education can also be used to increase awareness of the benefits of educating female children and can provide opportunities to those who missed the opportunity to attend normal schools. The removal of gender bias from curriculum materials and courses may also assist.

It can be concluded that on grounds of equitable access to education, and from indicators of participation and educational outcomes there is an overwhelming case for assistance to improve the attendance levels and achievement of girls in many developing countries. The evidence on rates of return suggests that these are generally no less than those for boys and may be greater. The significance of the widely cited externalities - improved nutrition, reduced child mortality, smaller family sizes, improved school; attendance, greater equity, etc. - varies from case to case. However, if any of these externalities are substantial, as it seems that often they are, this adds further weight to what is already a very compelling case.

2. AN ANALYSIS OF RESEARCH EVIDENCE ON EDUCATION AND DEVELOPMENT

This section extends the analysis of education and development issues to consider research evidence in seven specific fields. These concern the relationships between education and economic development; school effectiveness and student achievement; technical and vocational education; the balance of investment between educational levels; private educational expenditure and cost recovery programmes; organisational reforms, assessment practices and alternative delivery strategies; and literacy programmes.

2.1. Education and Economic Development

There has been a long standing debate about the contribution educational investment makes to economic growth. For a now familiar set of reasons there is no single answer to the question "how much does has education contribute to economic growth" and even less to the question "how much does education contribute to development." It would be surprising if there were. The relationships between educational investment and economic growth are complicated by many intervening variables which interact in different ways in different national economies at different points in time. And, of course, definitions of the characteristics of development are not stable either. But this does not mean that in either case we cannot reach inferences from the large volume of studies that have been undertaken. Rather we have to recognise that what may be true under certain circumstances may not be true under others and that the role education plays in supporting growth and development is one which is constantly evolving.

The economic literature focuses on measurable returns to educational investment to the individual and to society as a whole. Historical and sociological perspectives emphasise more the interactive relationships between educational development and economic change. At the lowest levels some measure of economic development often appears as a pre-cursor to the development of school systems in recognisably modern forms - infrastructural investment has to have taken place and economic surpluses are needed to provide the resources to pay for a school system. As an education system is established it may begin to catalyse further economic development. Thus, as Foster has pointed out (Foster 1987:94), the significance of increased schooling as an instrument of economic development may be highly variable over time. Expansion may have substantial economic and developmental pay-off at some stages and not at others. Some types of educational provision (at different levels, of different orientations, of different qualities) may have much greater effects than others.

The early studies of Denison (1962,1967,1979), Harbison and Myers (1964) and Schultz (1961) and Becker (1964) are well known. Denison approached the problem of how much education contributes to economic growth by attributing a proportion of economic growth not explained by increases in capital, labour and productive land to improvements arising from increased educational levels in the labour force. This produced results suggesting that 23% of US economic growth was a result of educational investment between 1930 and 1960, and 15% for the period from 1950 to 1962, and 11% for 1948 to 1973. This kind of analysis claims to provide estimates of both the direct contribution of education and the indirect benefits that arise from advances in knowledge. The latter are argued to be responsible for about 29% of growth in Denison's last study thus attributing 40% (29%+11%) to improvements in human capital and education broadly defined (Hicks 1987:102). When the approach was applied to other countries the results varied widely - from 2% to 25% in a group of developed countries and from 1% to 16% in a group of developing countries (Psacharopoulos and Woodhall 1985:16). Bowman (1980) suggested that in over 22 countries where estimates could be made for the period 1950-62 education made a direct contribution

to economic growth of more than 10% in only four. She also noted that the residual to be explained seemed to be greatest the higher the economic growth rate but that the contribution of education seemed to be smaller where growth rates were high. Others (e.g. Christensen and Jorgenson (1969)) have argued that if inputs and outputs are more completely specified than in the Denison model the residual to be explained is much more modest in size than suggested and, by implication, the contribution of education is over-estimated.

Harbison and Myers approach was to develop indicators of human resource endowments and compare these with indicators of economic development. Predictably choosing different indicators produces somewhat different results, but the overall correlation between greater human resource endowments and greater levels of economic development is robust. It leaves open the question of causality. Richer countries do indeed invest more in education and have higher endowments of human resources as a result. But this cannot lead to the simple conclusion that more investment in education in poor countries will lead to more economic development.

Schultz (1961) and Becker (1964) used an approach based on the rate of return to human capital. This assumes that individuals invest in education up to the point where the returns in extra income are equal to the costs of participating in education. Returns are both private (to the individual in the form of additional income) and public (to society in the form of greater productivity). Rates of return studies in developing countries have generally shown that returns at primary level are greater than for higher levels; private rates exceed social rates; social rates of return often exceed a 10% threshold- rates of return for education are higher in poorer countries (Psacharopoulos 1981, 1985); rates of return fall as economic development takes place; the greatest reductions occur at the lowest education levels as access becomes more universal (Haddad et al 1990:6). It has to be remembered that there are many well established methodological difficulties with rates of return analysis which include the problems of estimating incomes over time in changing labour market conditions and the validity of the assumption that the additional income received by the more educated is a result of additional education rather than other factors (Dore 1977, Carnoy 1980)). Indeed where modern sector salaries have declined, as they have in much of Sub Saharan Africa, and where expanded schooling has greatly increased the supply of graduates of a particular level, returns will have dropped, perhaps considerably, over the last decade. Rates of return will therefore be specific to countries, to particular levels and to particular periods in the development process.

In a somewhat different analysis Hicks (1980) has compared literacy levels (a proxy for educational levels) with historic rates of economic growth in 83 countries. He concludes that the twelve developing countries with the fastest growth rates also had levels of literacy above the average (68% compared to 38% in 1960). These countries had higher income levels and, since income is correlated to levels of literacy, this result might have been expected. However when income level is controlled, literacy rates were still 12% greater in the fastest growing countries, suggesting that faster growth rates were coincident with more developed human resources.

Wheeler's (1980) study of data on 88 countries tries to take into account interactions between economic growth and investment in human resources over time and give some insight into the direction of causality. His findings imply that literacy does have a strong effect on output levels and that greater literacy influences fertility downwards. This study suggests that increases in average literacy rates from 20% to 30% are associated with increases in GDP of 8% to 16%, with the strongest relationships in African countries. Marris (1982) uses data from 66 countries to argue that the cost benefit ratio of educational investment in human resources (based on primary enrolment ratios) ranges between 3.4 and 7.4 compared to ratios of 0.4 to 1.0 for investments in other types of capital. He also suggests that general investment has less effect on growth rates when it is not accompanied by educational investment. Psacharopoulos and Woodhall (1985:22) also suggest that investments in human capital have higher rates of return than those in physical capital in many developing countries, whilst the reverse tends to be true in developed countries.

2.1.2 Education and Productivity

At the meso and micro level there is evidence of the effects of educational investment on productivity and this has also been widely studied. These analyses can be conveniently separated into those that relate to agriculture, the modern sector, and the urban informal sector.

Agricultural productivity does seem to have a positive relationship to the education of farmers. After reviewing 18 studies containing 31 data sets which bear on agricultural productivity Lockheed, Jamison and Lau (1980) concluded that four years of primary education increased productivity by 8.7% with a standard deviation of 9%. When weighting was introduced to account for variations in standard errors associated with the various studies, the result was a 7.4% gain with a standard deviation of 6.8%. Though there were some studies that did not show gains the overall effect is clear. As might be expected there are reservations. Output was measured in terms of crop value in most cases - this is dependent on price structures that vary widely between crops and countries. Different studies measured educational inputs in different ways - e.g. number of years, highest grade completed, dichotomous achievement of literacy. They also associated the educational variables with different individuals or groups - head of household, an aggregate for all family members, or for all farm workers. In addition other

input factors were measured in a wide variety of ways - by quantity or value or time input, by type of capital available, by technological characteristics of farming (irrigation, new seed varieties, fertilizers etc.).

This review also indicated that agricultural productivity was more influenced by education in modernising than in traditional environments as Shultz (1975) had earlier suggested was plausible. Traditional environments were defined in terms of primitive technology, traditional farming practices and crops, and minimal reported levels of innovation. Modernising environments include access to new varieties of seeds, innovative farming practices, the control of erosion, the availability of pesticides, fertilisers and farm machinery, access to extension services and the existence of market orientated production. When the studies were simply classified into traditional and modernising environments the result was to suggest that four years of primary education increased productivity by a mean value of 1.3% in traditional environments and 9.5% in modernising ones. When regressions were undertaken the average gain in modernising environments was consistently 10% greater than in traditional environments. A recent update [Jamison, Lau, Lockheed and Evanson 1992] reaffirms this general picture.

Findings of five studies on education and agricultural productivity are reported in Haddad et al (1991:5) which include those by Jamison and Lau (1982) in Korea, Malaysia and Thailand and Jamison and Moock (1984) in Nepal. Four of these show positive and significant effects of education under different conditions. They support the view that the effects are greater in modernising environments. Though Thai farmers physical productivity and choice of technology was related to their educational level, it was not the case that they achieved higher prices for their outputs or lower prices for inputs, suggesting perhaps that they were no better at exploiting comparative advantages and using market information than others with less education. Market efficiency may therefore depend more on factors other than increased educational levels. The evidence from Nepal suggests that education does have an effect independent of family background and that increased productivity is related to improvements in farmers numerical skills giving some clue as to why the observed correlations exist.

A provocative study by Mingat and Tan (1988) suggests that Project Related Training (PRT) yields high rates of return in both agricultural and non-agricultural development. This study is based on an analysis of 115 World Bank projects taking the success of the project, rather than direct measures of earnings, as a criteria. However, high returns are concentrated heavily in countries where the general educational base is well established. Where illiteracy rates are high and educational participation rates are low PRT does not appear to be an effective investment. This may arise both because individuals with low levels of formal education are handicapped in absorbing training inputs and because countries where educational infrastructure is weak may also be those where management capacity is least developed and organisational capabilities are most limited. In countries where more than half the population are literate rates of return for PRT are more strongly positive for agricultural rather than non-agricultural projects. This may be the result of diminishing returns to training (non-agricultural projects tended to have more than four times as much training associated with them) and because agricultural projects tend to have greater dependence on people and skills and less on capital than many non-agricultural projects (Mingat and Tan 1988:238). The conclusions of this work argue that changes are need in PRT where its effectiveness appear very low for reasons associated with poor infrastructure and low educational endowments in the population as a whole. In these conditions institution building and support for improvements in basic education are a priority. Under other circumstances PRT appears very cost effective.

Studies of productivity in urban areas and in industry are much more common in developed countries than in developing countries. Much of this literature has addressed the debate between human capital proponents (who argue that education increases productivity which is rewarded by higher earnings) and screening theorists (who attribute the higher earnings of the more educated to factors other than the cognitive changes which are associated with studying to higher educational levels). The evidence does not conclusively favour one or the other approach (Winkler 1987:287). Part of the reason lies in the difficulty of measuring the dependent variable - productivity. If simple output measures are not available e.g. piecework production under standardised conditions, comparison is difficult between workers with different educational levels. Supervisor and peer group ratings can be used though these may not have high reliability. Comparison between jobs with different characteristics is problematic - the relative productivity of lawyers and plumbers cannot simply be assumed to be reflected in their earnings for a long list of reasons. And in any case the occupational mobility of urban workers is often high, resulting in situations where additional educational inputs may be reflected in increased productivity in subsequent not current jobs.

Global syntheses of the evidence on urban and industrial productivity and education are not very meaningful for the reasons given above. There are certainly studies which show positive effects on productivity of education amongst urban workers in developing countries (Fuller 1970, Berry 1980). Equally there are those that question the strength and nature of such relationships and which show how widely such correlations can vary across different types of job, from strongly positive to strongly negative (Little 1984). Selectively citing those studies that support a particular viewpoint would therefore be misleading. It should be noted however, despite the mixed evidence, employers in many countries adhere to a set of beliefs which does value explicitly educational attainment in the selection of employees. The research does not sug-

gest this is an unqualified judgement independent of job or job level. Moreover there is evidence that employers often conceive of the problem in terms of minimum levels of education suitable for different types of employment, above which other factors may become more important in the selection of employees (Oxenham (ed) 1984 :66). To the extent that this is generally the case it introduces the possibility of curvilinear relationships between educational level and productivity, where it is possible to be over educated and those with most education may produce less than those with more modest attainments in particular jobs.

Knight and Sabot's (1990) work based on the "natural experiment" of comparing samples of about 2000 employees in Kenya and Tanzania provides detailed insights into education, employment and income relations in those two countries at the beginning of the 1980's. Their findings support the human capital view that there is a positive rate of return to investment in secondary schooling in both countries. More specifically they argue that whereas the labour market returns to reasoning ability (as measured by Raven's Coloured Progressive Matrices) are small, and to years of schooling modest, the returns to cognitive achievement (as measured by numeracy and literacy tests) acquired through schooling are large (ibid:17). In Kenya cognitive skill accounts for three times more variance in earnings than do ability and years of schooling combined; in Tanzania the ratio is two to one. In neither country is being amongst the brightest of one's peers a sufficient condition for performance in the labour market - the predicted earnings of the most able primary completers are less than those of less able secondary completers. In both countries how much is learned in primary or secondary schools has a substantial influence on performance and income at work. Moreover the evidence suggests a complementary relationship between cognitive skill levels and returns on experience; the greater the former the greater the benefit from experience and training over working lifetimes. Intriguingly, cognitive achievement gains for secondary schooling for students of mean ability are 17% higher in Kenya than they are in Tanzania, despite the fact that per student expenditures are greater in Tanzania suggesting there may be differences in the effectiveness with which resources are allocated to teaching and learning (ibid:23). Educational expansion also appears to have led to compression of wage differentials over time contributing to a reduction in income inequality (ibid:30) as jobs for secondary educated students have expanded in number.

Knight and Sabot question some of the methodological assumptions that lie behind conventional rate of return analysis and suggest that some results may be misleading. They draw attention to the dynamics of labour markets fed by expanding numbers of school graduates as others have done. In particular false conclusions are likely to be drawn if the starting wages of new school leavers stand in a changing relationship to average wages for previous cohorts who entered the labour market when wage differentials were different. In the case of Kenya they suggest that this leads to an exaggeration of rates of return for primary school leavers sufficient to bring these below the level for secondary leavers when calculated on a marginal rather than average basis. This can be taken to suggest that greater emphasis on primary investment would have an efficiency penalty from a purely economic point of view. It should be noted that the data used in this very comprehensive study dates from 1980 since when labour market conditions will have changed. Like other studies of its type it appears to give little attention to unpacking educational quality variables - e.g. taking account of the school attended (since many employers are known to value the school attended in making recruitment decisions) and separating years of schooling from information on qualifications and grades achieved (qualification levels and grades are likely to be used by bureaucratic employing organisations for recruitment and promotion).

The impact of education on productivity is also a matter of concern in the urban informal sector. Here the problems of measurement are even more challenging than in relation to agriculture and modern sector employment, and the evidence is equally mixed. Hallak and Caillods (1981) were unable to establish a clear relationship when reviewing studies by the World Bank on entrepreneurship, by PREALC on the informal sector in Paraguay, Ecuador, the Dominincan Republic, by Nihan on Mauritania and Togo, by Aryee on Ghana, and by Van Dijk on Senegal. The Aryee study did suggest that gross output and earnings of heads of enterprise did increase with educational level, but only up to middle school level. In the PREALC studies the level of education that made a difference to income varied by employment activity being least in basic services and greater for repair and maintenance work. King's review of studies of training for the informal sector (King 1991 98-113) lists a large number of initiatives that have been taken to explore the interfaces between education, training systems and informal employment. As might be expected from the wide diversity of situations that they investigate these do not appear to lead to any singular conclusions. The impact of education on productivity within the areas reviewed is therefore variable and likely to appear at many different levels of significance. The conclusions that can be drawn have to be surrounded with caveats. There are likely to be circumstances where education has a strong effect on productivity and cases where this seems improbable. Which are which has to be the subject of specific research projects.

2.1.3 Educational Investment and Externalities

The existence of externalities associated with investment in education, which extend beyond the benefits to individuals, has already been highlighted in the earlier discussion of the benefits of education for girls and women. These are a subset of a range of externalities that have been identified by McMahon (1987:133)

and many others. This is an extensive field and one at an early stage where much of the force of the arguments exists at a qualitative level. McMahon's classification draws attention to external benefits to society at large, the local community, and spill overs to other communities, though it must be remembered that its perspective is essentially that of a developed country with substantial welfare benefits and educational services.

The first category includes a range of effects all of which are difficult to demonstrate but most of which are widely recognised. Education is attributed with benefits in creating more efficient markets with more sophisticated producers and consumers better able to process information and adapt to technological change. That this should be theoretically so is almost self evident if education does enhance cognitive skills. Whether the effects are more or less than the other factors that constrain the development of markets and limit access to information and new technologies is more difficult to judge.

Education is also argued to have benefits for civil society and public service. More educated citizens may be more likely to demand and exercise a democratic franchise for the collective benefit, they may be more likely to take part in public service activities and voluntary work, be more employable and they may be less likely to display criminality. To the extent that more educated citizens maintain their health status at a higher level, the costs of publicly financed health care may be reduced over what they would otherwise be.

The contrary is of course possible. More education may increase the demand for public health services despite reductions in morbidity. Since prolonged unemployment is often negatively correlated with higher levels of education it may also be that the public costs of unemployment could reduce with higher levels of education. Equally though it is possible that more education would result in a weakening of the employment-educational level link resulting in higher public costs for unemployment. In most societies the more educated display less criminality in terms of offences warranting imprisonment. Though more educated criminals may be more adept at evading prosecution and specialise in different types of crime, only a confirmed pessimist would argue that this was a dominant effect. Spill over benefits occur when groups other than those paying the costs obtain benefits from educational investment. This may occur regionally within countries where, for example, educated youths migrate and take with them skills and capabilities that are lost to their region but not to their country. It is also relevant to international migration which is increasingly an issue related to migration between developing countries as well as from developing to developed.

2.1.4 Education, Equity and Income Distribution

Income inequality may be affected by educational investment in a number of ways. These include the ability of more educational provision to raise income levels in general and remove groups from absolute poverty - richer countries tend to have lower levels of income inequality; the ability of education to raise incomes disproportionately amongst the poorest and provide avenues for social mobility; the financing and organisation of education in ways which generally favour poorer rather than richer families in terms of participation and which thereby diminish income inequality arising from the higher earnings of the more educated; and the interaction of educational level with other variables - fertility, mortality, health - which have a bearing on income distribution at the family and individual level.

The studies which have attempted to link increased educational investment and participation with income inequality do not show that strong relationships usually exist. Jallade (1974) argued that income inequality in Brazil had not diminished as a result of increased educational provision. Field's (1980) review of five developing countries concluded that though individual incomes were determined more than anything else by educational level achieved, relationships between distribution and performance on educational indicators at the country level were weaker than those with aggregate economic growth. Carnoy et al (1979) suggests that the explanation for this apparent paradox lies in the fact that earnings are influenced more by government incomes policies and by organisational features of employment than by educational levels of employees. Leonor and Richards (1980) argue in a similar vein using data from the Philippines and Shri Lanka. In both cases however both educational opportunity and income distribution appear to have improved over time.

Knight and Sabot (1982) argue that educational expansion in Kenya has reduced the relative earnings differential associated with secondary graduates by roughly 20% and has thereby reduced income inequality. This they suggest has been a more effective policy than government intervention on wages in the public sector, the favoured strategy in Tanzania. They thus argue the contrary point of view to Carnoy. Intergenerational mobility appears to have become more dependent on the educational background of parents and employers have become more likely to discriminate between potential employees on the basis of family backgrounds in Kenya (ibid:37). Income inequality reductions as a result of wage compression may therefore have been accompanied by increases in the intergenerational transmission of social status.

It is therefore difficult to find a consensus on the relationships between education and income distribution. Expanded access does appear to reduce income inequality, at least where a substantial modern sector exists as in Kenya. The relative impact of government policy on progressive taxation, incomes and subsidies will depend on how draconian these are and how effectively they are implemented. Educational expansion is frequently more attractive politically than

direct interventions to transfer wealth and income earning opportunities away from the relatively privileged (Blaug 1978).

2.1.5 Concluding Remark

What then can we conclude from the literature on the relationships between education and economic growth? First, that there is no single answer to the question some wish to pose - there are many answers depending on circumstance, developmental status and the specifications of the variables.

Second, the direct policy implications of macro level research are very limited. They are constrained by dependence on historical relationships which may or may not persist, the level of aggregation is often so high that effective and ineffective years of schooling are treated as similar, and the application of findings from individual countries or groups to other countries is analytically hazardous.

Third, far more studies imply, suggest and demonstrate plausible and positive links between educational investment and economic growth than suggest that the effects are non-existent. Even fewer studies suggest a negative relationship. It would be pessimistic in the extreme to suggest that the widespread faith in educational investment as a component of economic development was an aberration that could persist so extensively for so long if it did not contain elements of truth no matter how difficult these are to demonstrate.

Fourth, there is evidence in many studies of productivity benefits derived from educational investment. The most policy relevant ones appear to be those based on recent data which relate to circumstances in particular countries which can give some guidance on the most worthwhile types of educational interventions. Placing them in context is a necessary pre-condition for confidence in conclusions that can be drawn.

Fifth, educational effects are associated with various externalities that may have economic consequences. They may also extend to influencing income distribution and wider social inequalities through dynamic processes that need careful unravelling.

Sixth, there are many methodological questions in the analysis of relationships between education and economic development which have only partial resolutions. These are extensively debated in the literature (e.g. Psacharopoulos et al 1983, Little 1986, Hough 1992) and need no repetition here. The results of the various studies have to be understood in the light of these.

2.2. School Achievement, The IEA Data and Effective Schools Studies

2.2.1 School Achievement Studies

There are now a substantial number of studies on the factors that effect school achievement. The earliest examples were conducted in developed countries and established the importance of socio-economic background as a determinant of the performance of students in different types of school (Plowden 1967, Coleman et al 1966, Jencks 1972) and began to analyse the reasons for this. These studies were accompanied by a developing literature which offered a critique of the methods used and which also became entangled in the debates about nature and nurture in the development of intelligence, school achievement and subsequent success in the labour market (Bowles and Gintis 1976, Little 1975). Much of the concern was to explore to what extent meritocracies functioned as such and to what extent educational achievement behaved as an intervening variable explaining why in these societies socio-economic status of children continued to be linked closely to parents socio-economic status (Halsey 1977). These studies tended to show that school factors were less important determinants of scholastic success than home background factors. It was, however, misleading to draw the conclusion, as some popularisers did, that this implied that not much of importance went on in schools. It was differences that were being studied not absolute effects - as a weary commentator observed "students don't imagine algebra". Neither do most of them independently establish Newton's laws of motion.

Subsequently studies have appeared which extend the analysis and demonstrate that within school factors may be more important than previously supposed (e.g. Rutter et al 1983, Mortimore et al 1988). The studies also began to be applied to data from developing countries and suggested that school effects might be even more important than in developed countries. Thus Heyneman and Loxley's (1983) study of science achievement in 16 developing and 13 industrialised countries examined a range of school variables and regressed science achievement scores against them. This study found relatively little variance explained by school factors in the industrialised countries but much larger amounts explained in the developed countries (27% of the variance in achievement explained by school quality in Indian children and only 3% by social class; 25% by school quality in Thailand and only 6% by social class). However, the total variance explained in the cases studied was typically around the 20 -30% level leaving much that was not explained. School effects seemed more important in subjects like science where systematic study is generally only possible in schools.

The literature that now exists on school effectiveness is difficult to summarise. More than 50 multivariate or experimental school effect studies had been undertaken by 1987 relating to developing countries and were reviewed by Fuller (1987) (see Appendix for a summary table). The studies are methodologically diverse, vary in terms of the specification of the dependent and independent variables, use a range of

sampling techniques, and have been undertaken in very differently structured education systems. The problems include the cross-cultural transferability of notions like social class- the difficulties in specifying the dependent variable - achievement; the realisation that often large parts of the total variance remained unexplained after the effects of independent variables have been accounted for; and the rarity of studies that are capable of controlling for the entry characteristics of students. Not surprisingly a universally applicable set of conclusions is elusive. Synthetic reviews like Fuller's (1987) and that by Schiefelbein and Simmons (1981) have difficulties of aggregation that make it difficult to decide what importance to give to findings that appear true in some systems and not in others. What can we conclude from the 11 analyses cited of school expenditure and achievement, six of which confirm a positive relationship, and five do not? Or of Hanushek's review of more than 150 studies which concluded that there was no systematic relationship between expenditures and student achievement; or that attitudes and drop-out rates, reduced class sizes and more trained teachers were also unlikely to make much difference to achievement (Hanushek 1986). Common sense suggests that, in the limiting cases, levels of expenditure must have some relationship to achievement; nevertheless it is unlikely to be a sufficient condition alone. One of the earlier studies (Thias and Carnoy 1973) concluded that there was no relationship between expenditure per pupil and achievement at primary level but that there was at the secondary level. The latter was such that they claimed raising national examination scores by 5% would require a 50% increase in expenditures per pupil. This illustrates one of the limitations of this kind of analysis. There are many ways of increasing achievement and each will have a different cost structure. Simply redistributing existing resources towards the least favoured schools (which would have little or no direct cost) is likely to have a much bigger effect on achievement in those under performing schools than would distributing increased resources evenly to include those which already enjoy surpluses of qualified teachers, textbooks and other learning materials. The incremental rate of return on investment to raise achievement in schools which have no books or facilities will be much greater than similar inputs to well-funded institutions.

Another example of the difficulties that arise in taking a macro view of school effectiveness studies can be illustrated by the well publicised literature on the effect of textbooks on school achievement. Fuller's review indicates that 16 out of 24 studies show positive effects of the availability of texts and reading materials on achievement. Though the dependent variable was textbooks/student the independent variables that were controlled for in the studies varied. But perhaps more important is the lack of insight into whether the studies related to the first pieces of reading material available or additions to an existing stock (though one study (Heyneman, Jamison and Montenegro 1983) does show no gains resulting from a change in the pupil/book ratio from 2:1 to 1:1). Neither is the qualitative relationship explored between the types of reading material and the demands of the tests used to measure achievement - it is tempting to ask do comics have the same effect as academic reading materials? The improvement in achievement attributable to book provision in the Philippines in one of these studies (Heyneman, Jamison and Montenegro 1983) is argued to be twice the impact that would be gained by lowering class size from 40 to 10 students. But this finding uses evidence from an experimental study in the Philippines and data on class size effects from the U.S.A. which presumes that the range of variation in class size considered and teaching methods are indistinguishable between the two systems. Forewarned of some of the analytical pitfalls it is worth turning to some more of the findings. Fuller and Heyneman (1989) have attempted to identify effective and ineffective factors that influence school achievement, reducing their earlier list of 27 factors to a more manageable 9. These turn out to be:

Effective parameters	**% of Studies Showing Positive Effects**
Length of Instructional Programme	86
Pupil Feeding Programmes	83
School Library Activity	83
Years of Teacher Training	71
Textbooks and Instructional Materials	67
Ineffective Parameters	
Pupil Grade Repetition	20
Reduced Class size	24
Teachers Salaries	36
Science Laboratories	36

Some comment on each is in order. Repetition appears not to improve achievement in most of these studies. Since in most systems repetition implies just that - repeating the same material often with the same teacher without any special treatment and thus repeating and experience that led to failure before - this is perhaps not surprising if discouraging. In many systems repeaters have a disproportionate tendency to drop out. Paradoxically if repetition were reduced it might be expected to reduce average achievement levels if it meant that larger proportions of lower ability children proceeded to higher grades. Reducing repetition, where it is high (repetition rates in Sub Saharan Africa are often 15% or more at primary level World Bank 1988:136) is really a priority for other reasons. High repetition rates represent a serious source of inefficiency which increases the unit costs of graduates from a particular cycle and fills places with repeaters that might otherwise be occupied by those currently unenrolled. Though average levels of achievement might deteriorate as a result of enrolling more lower ability students, across the age group as whole (including those currently unenrolled) achievement would rise and unit costs reduce.

It may be that within a wide band achievement is not related to class size, but this does not mean there are

no limits. Physical constraints (classroom size) and accepted traditions place limits on what is acceptable. In most countries classrooms are not built to accommodate more than about 50 students in comfort and class sizes in excess of this result in overspill onto verandas without appropriate furniture. One of the highest scoring IEA science study countries (Korea) has large class sizes averaging over 60. But this is in a relatively well resourced system and one where learning motivation is high and disciplined study part of the cultural heritage. Intuitively the significant factor is when teaching practices change - practical group work is difficult when class sizes exceed 40, it may not be practised below this number. A lecture is likely to be as effective with 20 students as with 80 if the space is available. And class size probably does interact with other variables - if textbooks/pupil are correlated with achievement, large class sizes in situations where there is fixed stock of books (a realistic assumption in a rapidly expanding system) will probably diminish the correlation.

Teachers' salaries, at the level of individual teachers, are unlikely to be directly related to achievement for the simple reason that achievement is unlikely to be the result of the teaching of a single teacher - students will experience several teachers over their careers in school. Moreover it cannot lead to the conclusion that paying teachers better is unlikely to have an effect on achievement - it may be that the most effective teachers do not get the highest rewards; it may be that all teachers are paid so poorly that whatever variation exists is not reflected in performance; it may also be that incomes are so low they fail to provide motivation to all but the most dedicated. Given the fairly universal belief that incomes should be related to effectiveness the challenge is to change the reward structure so that they are.

The apparent ineffectiveness of level of laboratory provision may well reflect the nature of science achievement tests. If these do not test the skills developed in laboratories (which frequently they do not) it should surprise no-one that laboratory provision does not have a large impact on achievement measured through pencil and paper tests. These often emphasise recall and the abstract application of principles. The reasons for incorporating practical work in science have been thoroughly explored by Haddad and Za'rour (1986) who argue its benefits whilst recognising the difficulty of measuring its impact. The First IEA Science study noted positive effects of reported laboratory use in three of the four developing countries in their sample but Heyneman and Loxley's 1983 study found no such effect. Lockheed, Fonancier and Bianchi (1989) did find positive effects arising from teaching primary science in laboratories in the Philippines but note that the magnitude of this was much less than the effect of frequent group work and of frequent testing. The most recent IEA study (Postlethwaite and Wiley 1992) is complex to interpret on the subject of practical work and achievement; it does suggest that where students views of teaching indicate more practical work probably takes place, there is a positive relationship with achievement in five out of nine cases. The weight of opinion seems to lie with those who are sceptical about the measurable benefits of laboratory science for achievement as conventionally measured, and who stress its high costs (Wallberg 1991).

On the positive side, length of time spent on instruction is reported widely as having an impact on achievement. Heyneman and Loxley (1983) note this in relation to general science in India, Thailand and Iran. Fuller (1987) counts 12 out of 14 analyses supporting this proposition. There are wide ranges between countries in the amount of time allocated to teaching in different countries. Science instructional time varies by a factor of more than two in the IEA Second International Science Study as does the length of the school year. And actual variations will be greater still. In some countries many of the official teaching days are not utilised for their intended purposes as a result of teacher absenteeism, school functions, excessive examination practice, natural events and casual holidays. The more time allocated to instruction the more is likely to be learned, but there is no reason to suppose that the relationship is linear.

Feeding programmes are an established way of enhancing enrolment and increasing retention. They are however often very expensive and may reduce teaching time if teachers are involved in the preparation of food. School libraries also appear associated with improved achievement, though there is very little data on patterns of use. Since libraries tend to be found in better resourced schools with more favourable learning conditions and better qualified staff it may be that the general association is not strongly positive with library resources alone.

Pre-service teacher qualifications and training do show up in many studies as positively related to achievement. The magnitudes of the effects are often moderate however. The effects are difficult to measure - since children experience different teachers should recent training be given the same weight as training ten years ago? - and the number of years of schooling completed before training may be at least as important as the training itself. One recent study (Lockheed et al 1986) suggests that other inputs i.e. textbooks can be substituted for additional training since textbook use and training did not interact in their data and the effects of textbooks were greater. Very little evidence exists on the effectiveness of in-service training. Those studies that do exist are generally positive but often have no means of controlling for the effects of training as opposed to the traits of the teachers who choose to take advantage of it. Those involved are generally the more motivated and skilled in the first place. Of course it is also likely to matter what teachers are being trained to do and what kind of students they are teaching though this also is also largely unresearched.

There is little doubt on the margin that textbooks do

have a major impact on achievement in most subjects, and probably the more so in science and other subjects which depend on special school based resources. Unfortunately beyond the level of the existence of textbooks in reasonable quantities there is little research to indicate at what point additional written material ceases to have an effect (the Philippines study mentioned above is an exception); or what the relative impact of different types of material is - teachers' guides, student texts, worksheets, reference books. And every teacher has opinions, often well founded, about good and "bad" books. Every textbook is not the same - some have inappropriate reading levels, some are poorly structured, some contain factual errors, some are produced with poor quality and uninteresting design and contain heavy gender stereotyping.

2.2.2 Recent Methodological Developments

Ridell (1989) has recently offered a critique of the school achievement studies literature. This argues that the first wave of studies in the 1960s in developed countries made considerable use of production function like models used by economists in specifying variables. The second wave, placed more emphasis on process variables - e.g. teaching styles - and the educational rather than statistical significance of findings. A third wave is now developing which uses multi-level modelling techniques that can accommodate the self evidently hierarchical nature of data on school systems (students learn in classes which are part of schools which are part of districts and national systems). Most school achievement studies in developing countries, she argues, have been undertaken using the methods of the first wave. These have limitations, not least a hazardous reliance on a particular statistical procedure to define the proportion of variance associated with different variables which leaves much variance explained, and is unable to account adequately for variance arising from different levels or, for example, for the effects of selection. As a result it may be that the differences attributed to school rather than individual and home background factors may have been exaggerated when comparisons are made between developed and developing countries. Heyneman (1989) defends the use of the analytical techniques of the 1970s (predominantly ordinary least squares) since multi-level modelling was not available at the time. He also argues that the refinements are welcome but are unlikely to change the nature of the challenge of raising the availability of school quality of school inputs and distributing them more fairly.

2.2.3 Some Results from the IEA Science Studies

The Second International Science Study of the IEA justifies a brief review since it addresses a learning area frequently recognised as central to human resource development policy. This study includes data from 24 countries of which China, Ghana, Nigeria, Papua New Guinea, Thailand, the Philippines, and Zimbabwe can be clearly located as developing countries. Hong Kong, Singapore, and Korea might also be classified in this way albeit that their economic development has reached a different level. The IEA studies have been conducted on three populations, broadly speaking 10 year olds (Population 1), 14 year olds (Population 2) and those in the last year of schooling before university entrance (Population 3).

The interpretation of the IEA findings is very complex and it is only possible to draw attention to some of the main findings here. These are tentative since variations in the data sets are important for any comparison between countries and all of the overall findings need contextualising in more detail than can be provided. Moreover what may be true in the lowest scoring developing countries as a group is often not true in the other developing countries. With all these caveats some of the main findings are described below.

In terms of total score Ghana, Nigeria, the Philippines and Zimbabwe have the lowest total scores on the science tests. This is true in aggregate and in different subject areas. Other developing countries - e.g. Papua New Guinea, Thailand and China have means that are comparable with industrialised countries like England, and the U.S.A.. Hungary and Japan score consistently well above most other countries. In general there is a high inter-correlation between scores at the population 2 level and those for population 1 suggesting that low performance is compounded through the system. There are considerable changes in the ranking of mean scores by country at the population 3 level which are heavily influenced by the selection practices of different countries which, in some cases, concentrate resources on the most able science students.

In general the proportion of schools scoring below the lowest school in the highest scoring country (Hungary) was high in the low scoring developing countries in the population 2 sample (Ghana 64%, Nigeria 88%, Philippines 87%, Zimbabwe 80%). In these countries the performance of the lowest 20% of students tested indicates that they have learned very little science. This is particularly worrying when it is realised that the Nigerian students were from a higher grade than in other countries, and the Ghanaian students were from selective and elite schools. The IEA data suggests that the bottom 20% of students in Ghana, Italy (Grade 8), Nigeria, the Philippines and Zimbabwe are "scientifically illiterate". Interestingly England, Hong Kong, Singapore and the USA are borderline cases. Indeed the USA has a higher proportion of schools scoring below the worst school in Hungary than does Thailand.

Of particular interest is the finding that the teaching group or class that pupils are in is of considerable significance to the scores that they achieve in some countries but not others. This effect is particularly prominent in Ghana, the Philippines, Italy and the Netherlands. By contrast in Japan and the Nordic countries at this level the effect is very low indeed at the population 2 level. This changes dramatically in Japan at the population 3 level, probably because of

the increase in the proportion of private institutions at this level. One of the implications of this appears to be that in some countries differences between schools are considerable and it does matter a great deal in which school or class students study science, in terms of their achievement. In other countries, school and class effects are much smaller and have much less influence on achievement. This is not simply a function of resource levels; rather it seems to depend more on selection and streaming practices and organisational features of education systems.

The IEA authors have developed a yield coefficient that modifies the distribution of scores by the proportion of the age group in school. This is intended to indicate how many children know how much science. It highlights differences between countries and shows that yield coefficients tend to be much lower in those countries with the lowest proportions in school which are mainly the developing countries at population 2 level. This raises a dilemma for countries; with low yields wishing to improve them should numbers enrolled be increased or should low levels of achievement be improved first?

At population 3 level in the IEA data inter-country comparisons are even more hazardous than they are at population 2 level. There are wide disparities in the percentage of the age group studying at this level from 1% in Ghana and Papua New Guinea to 89% in Japan). The average age of this population spans 23 months. There was a 2 year grade difference in the level which the tests were applied to. The average number of subjects studied varied from 3 to 9 or more with concomitant variations in the time spent on science.

Generally England, Singapore and Hong Kong and Hungary have the highest scores in population 3 with some variations between subjects in this. These countries also have small numbers enrolled and highly specialised curricula. In general the IEA found no relationship between the proportion studying science and the achievement of elite students defined as the top 3% of the age group. There was no significant tendency for the number of subjects studied to influence science achievement except in Chemistry. Positive age effects were noted with older students scoring better.

The IEA study demonstrates that sex differences greatly favoured boys in the countries with the lowest overall scores (a category including many developing countries) in terms of the performance of both the bottom 20% and the top 20%. Though in Hungary sex differences were minimal, in Japan, the other high scoring country, boys outperformed girls consistently at all levels of ability. Typically sex differences in performance are greatest in physics and least in chemistry.

2.2.4 A Note on the Effective Schools Literature

The most recent collection of studies on effective schools is that by Levin and Lockheed (1991). This work includes case studies on effective schools and reforms that have promoted their development. It also reviews data from recent studies using the multilevel statistical techniques referred to earlier. The overview offered identifies necessary inputs and facilitating conditions that seem to be related to effective schools.

On the input side four critical aspects are identified. First curriculum relevance, content and sequencing is seen as essential but often not adequately provided. Second the availability of instructional materials is stressed as central to effective learning. Successful schools almost invariably seem to provide sufficient instructional materials for students and high achievement usually correlates with textbook availability. Third, the time available for learning is identified as significant. Successful schools appear to ensure that greater proportions of the time allocated to learning are occupied with learning activity and increases in learning time generally bring learning gains. Fourth, they argue there is some evidence that the more learners are actively involved in the learning process the more likely it is this learning is successful.

Facilitating conditions are delineated as including first a level of community involvement which may take many forms from additional resources supplied by the community, to contributions the school makes to the life of the community and direct parental involvement. Second the professionalism of schools is identified as important. This is associated with effective leadership, teacher commitment and competence and adequate accountability. Third, flexible approaches to organisation and teaching and learning are identified. This includes the ability to adjust curricula and organisational arrangements to reflect local conditions and adapt teaching methods to suit different groups of children.

The individual case studies draw attention to what can learnt from experience with projects in a range of countries that include Thailand, Nepal, India, Colombia, Brazil, Shri Lanka and Burundi. In some cases, for example the Shri Lanka case study, there are illustrations of how relatively small inputs into quality improvement programmes appear to result in large gains in achievement and participation. Others argue the importance of ensuring political will exists to improve school conditions and performance and that the benefits of improved educational access and quality must be expressed in terms which offer gains to those in power as well as those on the margins if they are to be reflected in quality improvement programmes.

Though it is sometimes difficult to untangle those findings that have general utility and those that are specific to particular circumstances the school achievement literature provides a lot of food for thought about the relative importance of different types of intervention to improve school quality. It encourages clearer definitions of the attributes of "good" schools and the kind of achievement that is valued. It also focuses attention towards those inputs and processes

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that are manipulable through education policy and those whose locus of control lies elsewhere. Finally it can illustrate gaps between policy intentions and actual outcomes, thus drawing attention to implementation problems.

What this kind of analysis cannot do should not be required of it. It cannot generate policy prescriptions across widely differing countries and education systems that do more than point the way towards worthwhile possibilities that need exploration and validation at the intra country level. It is here that studies can provide the most reliable guidance for assistance targeted on areas where it will have the most impact. At this level one of the central questions of the school achievement literature invites inversion. It is not so much a question of what makes a good school - good schools are self evidently not the problem. It is more a question of why are some schools, often with apparently similar resource endowments, judged inferior to others and how can their performance be improved at replicable levels of cost?

2.3 Technical and Vocational Education

2.3.1. Rationales

Educational assistance for technical and vocational education has a long history. It has always had attractions to policy makers since it seems to offer to kill several birds with the same stone. Thus justifications for investment are frequently couched in terms of one or more of the following overlapping categories:

> increased relevance of schooling to likely occupational futures
>
> reductions in youth unemployment as a result of the acquisition of employable skills
>
> increased economic development arising from improvements in the quality and skill levels of the working population
>
> poverty reduction through giving access to higher income occupations to those who do not succeed academically
>
> transformation of attitudes amongst youth to favour occupations where there are some employment prospects

Foster (1965) in the seminal study that produced the "vocational school fallacy" was one of the first to point out the second best nature of vocational training as a way of increasing the relevance of schooling to occupational futures. His study in Ghana argued that academic schools were in fact perceived as vocational since they led to the most desirable modern sector jobs and that vocational schools would inevitably be regarded as inferior and orientated towards vocations that were unattractive-a second best option unless conditions in the wider labour market changed.

The second justification has suffered from another kind of fallacy. Training, especially that directed towards waged employment, does not of itself usually produce jobs. It may redistribute who gets the jobs and it may over time contribute to increased productivity, expansion and more employment. But this is unlikely to be its first impact except where there really are acute shortages of skilled labour which constrain production.

The third justification has the force of human capital theory behind it. In so far as a more educated and trained workforce will be more productive, and in so far as the other factor inputs necessary for production are available in sufficient quantities, appropriate training can increase production and productivity and thereby accelerate economic development. This will only happen if the training is appropriate, those who benefit from it use the skills they have acquired in their livelihoods, and there are enough job opportunities for relevant employment to be possible.

Poverty reduction may occur through investment in training if indeed it is the poorest members of the community who gain access to training opportunities of comparable quality to those available to other sectors of society. Where such opportunities simply shadow, with lower quality, those available in other institutions gains to the relatively poor will be diminished in competitive labour markets.

And as for the problem of the transformation of attitudes this returns to the Fosterian argument that such attitudes are not basically formed or reinforced by schools but by the economic and social realities of wider society - "the idea that children's vocational aspirations can be altered by massive changes in curriculum is no more than a piece of folklore with little justification" (Foster 1966:405). Respect for and attraction to jobs in agriculture, rural areas, the informal sector, and traditional service industries appear more related to the objective realities of income, working conditions, and prospects for betterment, than to the influence of vocational schooling on the attitudes of labour market entrants (Achola and Kaluba 1989).

Since Foster's analysis resistance to curricula that introduce agriculture into schools has widely been assumed to be inevitable (Bowman 1980). However some recent studies have questioned the extent to which this is so. Riedmiller and Mades (1991) reviewed experience in 30 countries of primary school agriculture. Studies from Tanzania, Zimbabwe, Cameroon find positive attitudes amongst parents to primary school agriculture; teachers in Zimbabwe and Botswana were less favourably disposed believing that they had not been trained for the subject. Research on curriculum reforms in Tanzania and Rwanda suggested that teachers were generally cooperative and that the reactions of local communities were positive (Riedmiller 1989). An evaluation of environmental

and agricultural science in Zimbabwe (Lewin and Bajah 1991) also found generally favourable attitudes amongst teachers and students to the subject. Fieldwork suggested that the agricultural aspects of the course were amongst the most popular parts which caused the least learning difficulties. Indeed since agriculture has remained a feature of many African primary school curricula (all 30 countries covered in Riedmiller and Mades' 1991 review) it suggests that it does have a perceived value. A possible explanation is that this is the case at primary level, but at secondary, where the competition to enter modern sector jobs starts in earnest, Foster's thesis still stands.

2.3.2 Approaches

At least four main approaches to technical and vocational education have been identified (Lillis and Hogan 1983). These include:

> Curriculum diversification at a system level which seeks to reorientate the whole school curriculum towards occupational relevant skills.
>
> Parallel systems where technical and vocational institutions exist alongside a general schools system with a conventional academic orientation.
>
> Core curriculum options that provide vocational and technical programmes within the structure of general school curricula as a minor but substantial component.
>
> Non-formal systems which provide opportunities for out of school youth to acquire vocational and technical skills which may be used either to obtain formal sector employment or promote the development of self employment and the development of the informal sector of the labour market.

Of these the first was widely supported as a strategy throughout the 1960s and 1970s. The research consensus is disappointing. Diversification is not thought to have resulted in the achievement of many of the aims set for it in most countries. Moreover there has been a swing away from such approaches (Middleton 1988:223) since the late 1970s as a result of increasing levels of disillusion with the impact of such reforms.

Technical and Vocational schools as separate entities are probably the most widespread form of institutionalised provision of technical and vocational education. Commonly they suffer from lower quality student intakes than normal academic schools, at least in terms of the general levels of scholastic ability represented by school examinations.

A curriculum option approach to technical and vocational education is also widespread and continues to find favour in many countries. Pre-vocational studies, living skills, and more traditional offerings like woodwork, metal work, and agricultural and domestic science, secretarial and commercial skills, principles of accounts, etc. appear widely. More recently technology and engineering studies have begun to appear. Some of these subjects are incorporated into compulsory cores in some countries and others are treated as options which are not compulsory.

Non-formal approaches are usually provided by non-government agencies with or without assistance and by companies with an interest in providing training to their workforce and the community they serve. This covers a very wide range of activities from the truly non-formal with low levels of structure and high levels of experiential learning, to arrangements which provide classroom teaching towards specific objectives outside the normal institutional frameworks.

It was always likely to be difficult to strike the right balance between academic and production related activities though some projects e.g. the Secondary School Community Education project in Papua New Guinea, have approached the problems with a considerable amount of imagination (Vulliamy 1983). Though production orientated aspects of the curriculum can, under some circumstances, make contributions to the costs of schooling though these are usually modest (Swartland and Taylor 1986, Bray 1988, Achola and Kaluba 1989). For all these reasons the emphasis in many countries has moved away from education with production models of schooling towards greater focus on developing basic learning skills in the primary and junior secondary grades.

Enhancing the links between schooling and work was widely advocated in the past in parallel with non-formal initiatives in technical and vocational education to increase the relevance of education to occupational futures. In many countries students were encouraged to take part in production activities for educational reasons and in order to make a contribution to costs. The experience highlighted several limitations. Amongst the most important were those mentioned in the box overleaf.

> students and parents adverse reactions to increased amounts of time allocated to production where this was seen to damage performance prospects in competitive examinations for selection;
>
> the limitations of school environment which precluded some kinds of activities – e.g. insufficient tools and machinery, no accessible markets; lack of suitable land (Gustafsson 1985);
>
> the need to subsidise relatively inefficient production (directly or through discounting labour costs), or provide protected markets (e.g. for furniture made by schools); the fact that scarce production skills have an economic value and skilled practitioners may be unwilling to share these with others or see their market undermined (Lewin and Little 1984);

the over emphasis on production leading to the subordination of learning to repetitive manufacturing tasks which provide little coherent skill acquisition

2.3.3 Purposes

Before examining some of the evidence on the effectiveness of technical and vocational training it is important to extend discussion to consider the purposes of training. First a distinction must be made between technical and vocational provision that is direct towards training for specific jobs, and that aimed at more generalised skill up grading with a flexible range of outcomes that can be utilised across a number of occupational categories. The former is often more appropriate to employment in those parts of the labour market where specialisation is well developed and trade skills are licensed. The latter has attractions in areas where there is rapid change, such that specific skills are soon outmoded by changes in the technology of production, and where occupational opportunities are more commonly of a polyvalent rather than monovalent character. In the poorest economies specialisation is often at an early stage and the number of job opportunities are limited before particular specialised labour markets saturate. More developed economies have more opportunities for specialisation and for those with a flexible range of skills who may move from one occupation into others.

It is also important to distinguish between training as a preparation for existing jobs, training intended to lead to job creation, and training designed to improve performance on the job. Most technical and vocational training initiatives have been built on the first or third assumptions. The first may focus on pre-career qualification that can be wasteful if most graduates of courses do not enter occupations for which they have been trained. The courses provided may become training to qualify to get a job, rather than courses which actually deliver skills necessary for doing the job, unless there are close links between providing institutions and employers. Training designed to improve job performance is, of its nature, more likely to occur in or near the work place. The exceptions may be where bureaucratic employment regulations insist on qualification upgrading as a major criteria in promotion relatively independently of job performance.

Training for job creation has widely proved problematic. There are many difficulties that confront inexperienced young adults in starting a new livelihood rather than entering existing employment (e.g. the availability of capital, credit and land, attitudes of senior community members, existence of and access to markets, the problems of employing other worker). Where self employment opportunities exist and can be expanded, those who have been in the labour market for some time may take precedence, and have competitive advantages, over those emerging from training programmes. Skill exemplars to organise training may be unenthusiastic about sharing their skills with those who will compete with them and possibly lower incomes as a result. Entrepreneurship training may be especially difficult. The characteristics of entrepreneurs and how these are acquired are poorly understood. Entrepreneurs are, almost by definition, a scarce commodity in most communities. There may be strategies to assist those who display such talents; it is likely to be much more difficult to train individuals to acquire them.

2.3.4 Cost Effectiveness

Metcalf (1985) has reviewed studies that bear on the extent to which vocational and technical schools are a cost effective approach to investing in human resources. In general this review concludes that rates of return are usually sufficiently positive to justify training. However, short rather than long courses tend to be more cost effective and informal and firm based training tends to be more cost effective than separate vocational and technical schools separated from production organisations. Between 1966 and 1988, 21 studies have been identified (Haddad (1991:46) several of which make comparisons between academic and technical and vocational education. The findings are generally consistent with those highlighted by Metcalf. They reinforce the view that in plant vocational training may be more cost effective than training in separate schools and that short courses may have higher rates of return than longer ones.

However there is a wide variation in the findings relating to different systems. In some cases productivity gains can be identified (Fuller 1970, Min and Tsang 1987), higher rates of return than to academic schooling are evident (Chung 1987, Ziderman 1988) and graduates of technical and vocational training are more valued in the labour market (Chin-Aleong 1988). In others there seems little labour market advantage for technical and vocational graduates (Psacharopoulos and Loxley 1985, Moock and Bellew 1988) suggesting the benefits of training are not always reflected in labour market signals. There is also evidence that levels of academic achievement may suffer (Schiefelbein and Fareli 1982) and that in some circumstances graduates of training courses may be less likely to pass government trade tests than those without such training from academic schools (Godfrey 1977). Qualification levels amongst technical school graduates in work and those out of work may be quite similar suggesting other factors may be more important in determining job placement (Narman 1988). Generally, social rates of return for technical and vocational education are less than private rates. Then latter may be quite high (Grootaert 1988) where there are high levels of public subsidy and employment opportunities.

The financial aspects of providing technical and vocational education, where unit costs tend to be higher than in general academic schools have been the subject of an extensive debate. The complexities of estab-

lishing cost differentials are considerable and include difficulties with the treatment of direct and indirect costs, the rates of discount to apply to capital costs, social and private costs, and the appropriate unit of analysis. Should this be teaching periods, the completed programme or something else? (Cummings 1988). In Tanzania it appears that recurrent costs are 19% greater in agricultural schools than academic schools, 13% greater in technical schools, and 9% greater for commerce (Hinchliffe 1983). In Kenya industrial education subjects have double the staffing costs and five times the capital costs of normal subjects (Cummings et al 1985). In Thailand unit costs in agricultural and technical colleges were 98% and 54% higher respectively than in other professional training colleges (Tibi 1986). Technical education has a higher pay-off than general education in the Ivory Coast at all levels but the costs are much higher (up to two and a half times those in general schools) (Komenan 1987). In the case of Colombia and Tanzania (Psacharopoulos 1985) these costs are not justified by the demand for trainees in the labour market and the social rates of return that have been calculated illustrate this. In other cases training is considered to have been more cost effective than academic schooling (Ziderman 1988, Neuman and Ziderman 989) at least in relation to provision for those unlikely to continue to post secondary education who to work in fields related to their training.

2.3.5 Some Conclusions

Psacharopoulos (1988) argues that recent studies of technical and vocational education lead to a number of conclusions outlined in the box below. It should be clear that the analysis that lies behind these observations does not constitute a definitive case against further assistance for technical and vocational training. It simply draws attention to what can be learnt from the experience so far. Most of the contributors to recent reviews (International Review of Education 1988, International Journal of Educational Development 1988, Economics of Education Review 1990, World Bank 1991) offer analyses that provide general support for most of these conclusions. Collectively they focus future policy options around a number of issues.

Vocational education is expensive

The incremental social benefits may not outweigh the costs

Vocational graduates may not follow the career for which they have been trained

Projections of demand for specific skill training are unreliable

Substitutability between vocational and non-vocational school graduates may be high

Vocational and technical education provided close to or within places of employment is more likely to be successful than that provided elsewhere

Vocational and technical education may be more equitable and efficient when privately financed.

First, no single approach can capture the range of possible training purposes and delivery strategies available and indicate their relative attractiveness. It is clear that in general, vocational and technical education can have a substantial role to play both in the development of specific skills and in relation to flexible preparation of the workforce for changing labour markets. But this will only be happen where a series of conditions are met that justify the particular strategy employed.

Second, in devising appropriate strategies several considerations are important. These include those noted in the box below.

avoiding assumptions which the weight of evidence usually, suggests are unfounded (e.g. that vocational training changes attitudes to different types of employment and that almost all trainees will necessarily follow the occupation they have trained for).

improving information on current patterns of supply and effective demand for particular skills and more general technical abilities through tracer studies and occupational training maps

establishing direct and indirect costs at an early stage and comparing these with other delivery strategies directed towards the same ends.

identifying benefits on both conservative and optimistic assumptions about the absorption and substitutability of trainees in the labour market.

examining the equity effects of different policy options – it may be that technical and vocational opportunities are disproportionately available to the relatively disadvantaged.

Third, technical and vocational training however conducted generally takes for granted basic levels of literacy and numeracy, and often an understanding of scientific concepts, without which training inputs will be compromised. More educated trainees often benefit more from training than their less educated peers. Support for the development of basic education to achieve these antecedent conditions may take precedence where the evidence suggests this is a prior problem.

Fourth, in general training undertaken with close relationships between employers and training institutions which is in-career rather than pre-career often, but

not always, seems to have greater likelihood of beneficial and cost effective outcomes.

2.4 The Balance of Investment between Educational Levels

It is often argued that because higher education unit costs are much greater than those at secondary and primary level there is scope in many developing countries to shift educational investment downwards. There are several elements to this argument.

Taking Sub Saharan Africa as an example Table 2 (Section 1.1) shows that in 1988 the ratio of primary:secondary:higher education costs was 1:3.6:31.8 (based on expenditure per student as a percentage of GNP per capita). There is a wide dispersion from the mean in different countries such that in some higher education unit costs are more than 50 times those at primary. Table 3 (Section 1.1) shows that higher education enrolments consistently grew faster than those at the first level (4.5 times faster over the period 1980-88 (UNESCO 1991:98)). Thus for every additional place in higher education an extra class of primary school children could have been financed. Moreover the proportion of total public educational spending allocated to higher education in low income Sub Saharan African countries averaged about 20% in the mid 1980's (World Bank 1988:140) though enrolments at this level accounted for less than 1%, of total enrolments at primary and secondary level. The beneficiaries of higher education are disproportionately drawn from relatively high income groups, since children from these backgrounds have the highest survival rates through secondary schooling and are more likely to reach high levels of academic achievement. Rates of return to education in low income countries tend to be higher for primary than higher education - the mean rates of return for primary, secondary and higher education respectively have been calculated as 26:17:12 for social rates of return and 40:20:32 for private rates of return in 12 Sub Saharan African countries (Haddad et al 1991:7). Taken together these observations seem to present a strong case in favour of more educational investment at lower levels and less subsidy of higher education from the public budget.

Further examination of this issue suggests that the case is not so clear cut. First, it is reasonable to argue that some higher education is needed in all countries to meet high level human resource needs.

In many Sub Saharan African countries there remains a chronic shortage of competent degree level personnel, evidenced not least by the slow progress of many localisation programmes and the difficulties of recruitment for industrial concerns and in the public sector. Second, it may be the case that the problem is at least as much one of pervasive inefficiency and marginal relevance in higher education investment as it is one of over- investment. Though there is very little evidence on declining quality in higher education and few studies have taken place (King 1991) there is widespread disquiet about the orientation and effectiveness of higher education, especially in Africa (Bown 1992, Mazrui 1992).

Third, it is to be expected that, in those countries which are approaching universal enrolments at primary levels, the percentage of the budget allocated to higher levels will grow as a result of increased post-primary provision. Of more concern are those cases where changes in unit costs disproportionately favour higher education. In Sub-Saharan Africa recurrent unit costs fell at primary and secondary level in the early 1980's, but appeared to increase for higher education. Median values in constant 1983 US$ fell from 67 to 48 at primary level; 362 to 223 at secondary; and rose from 2,462 to 2,710 at tertiary level over the period from 1970-1983. These aggregate figures require cautious interpretation since the number of countries for which data are available differ at each educational level (World Bank 1988:141-3). Since 1983 the financial position of higher education has probably worsened substantially and the trend may have been reversed. Where structural adjustment has taken place this has often sought to limit the growth of higher education subsidies though success in achieving this has been mixed. It is probably a minority of countries that have actually seen higher education as a whole grow more slowly than other levels. This has usually been where there has been a strong policy preference in this direction e.g. in Malawi and Tanzania which have deliberately limited the supply of post primary places and have resisted the pressures of excess demand, at least in so far as the publicly financed elements of the system are concerned.

Fourth, data on rates return and the conclusions that can be drawn from it has to be treated with caution for many well known reasons which have long been discussed in the literature (Hough 1992). The rates quoted above are historic rates many of which are based on relatively small samples taken more than a decade ago and which contain assumptions that may no longer be robust. Distortions in income patterns, related to structural characteristics of the labour market which may under or over value the contributions to production of different groups of workers, are also common and make reliable calculation difficult. There are apparently some consistent patterns that show, for example that the differences in rates of return between levels do tend to collapse over time as development takes place. This is almost inevitable. As more individuals acquire a particular level of education the marginal value is likely to decrease and "wage compression" is likely to occur (Knight and Sabot 1990).

Fifth, it is debatable how significant reducing subsidies to higher education might be. Mingat and Tan (1985) have made attempts to measure the resources which would be released by reducing or eliminating subsidies at higher levels. Their study indicates that the scope for this tends to be greater in Francophone Sub-Saharan African countries where unit cost differences are greatest. Using data from 10 countries (8 of which

are Francophone) they argue that 10% reductions in higher education subsidies would permit about 2% increase in primary enrolments. Similar changes at secondary level would support an increase of 1.6% in primary enrolments at the current unit cost levels. It is only when large reductions in subsidy and high levels of recovery of operating costs are introduced that substantial enrolment gains become possible at primary. Thus if higher education student subsidies were cut completely, Gross Enrolment Rates [GER] at primary could be improved by up to 18 points in some cases, though the average is much less than this. Removal of all subsidies at higher and secondary level and 100% cost recovery in higher education fails on its own to release enough resources for universalising primary in most of the countries studied. Part of the reason is that the countries with the smallest current primary enrolment levels also have the smallest absolute enrolments in higher education and therefore the lowest amounts of subsidy which can be transferred. Since unit cost ratios are much lower outside Africa the impact of subsidy withdrawal elsewhere is potentially less. This situation would change if higher education continued to experience the highest growth rates and pre-empt more and more of the public budget.

Despite Mingat and Tan's analysis it should be remembered that worthwhile transfers are possible. In a system which spends 20% of its finance on 1% of the cohort at tertiary level a reduction in the length of higher education by one year from say four to three (and/or by combining some income earning work experience with study to achieve the same effect), or by increasing student teacher ratios by 25% (these were estimated to be around 11:1 in 1983 in low income Sub Saharan Africa) could release about 4% of the total education budget. This could represent as much as a 10% increase in primary expenditures and enrolments. There are some examples where transfers of this kind are being pursued (e.g. in Senegal and Ghana (Colclough with Lewin 1993).

A further dimension of the question of balance between investments at different levels relates to secondary education costs. As primary GERs increase the cost burden of secondary provision will increase if transition ratios from primary to secondary are kept constant. Historically, transition ratios in most systems have grown as primary has expanded thus tending to increase the proportion of total expenditure allocated to secondary education. Secondary costs may grow at a multiple of increases experienced during primary expansion since unit costs are typically about four times greater at secondary. It then becomes at least as urgent a financial priority to examine efficiency related reforms at secondary level that can reduce unit costs if heavy skews in favour of secondary are not to emerge.

The implications of this brief analysis are that in some developing countries a case can be sustained that it would be both more efficient and more equitable to shift some level of public subsidy from higher education to lower levels. This is most likely to be the case where unit cost differentials between educational levels are high, the labour market shows signs of saturation for particular types of graduates, where primary enrolment ratios are low suggesting that a large proportion of the population has little access to any education, and where progressive taxation measures are weak.

There are a number of possible policy options where such conditions pertain. Which are the most appropriate ones will depend on particular country circumstances. They include various kinds of efficiency measures to reduce unit costs at higher levels, planned shifts in subsidy to lower levels, and cost recovery mechanisms to capture surplus income and reduce subsidy levels. The balance of arguments regarding the latter, in terms of both equity and efficiency, will depend on the educational level to which they are to be applied and the detailed nature of their specification. Some of the possibilities are discussed in the next section.

2.5 Private Expenditures and Cost Recovery

2.5.1 Private Financing

National policy on private education and the introduction of various types of cost recovery is an important consideration in policy dialogues with donors. In so far as increases in educational investment can be achieved through increased private expenditures more pupil places can be financed by the public budget and/or quality improvements can be introduced. This is only likely to remain attractive if other educational development indicators do not deteriorate as a result of introducing such policy reforms. This is a current issue for debate since policy to encourage cost recovery is commonly associated with adjustment loans. One fifth of a sample of 50 structural adjustment loans recently analysed included conditions that required the introduction or increase of fees for books and tuition (Stewart 1991a:19-21) and many countries have independently introduced similar measures.

There is very little detailed data on the distribution of private and public enrolments in most developing countries. Psacharopoulos and Woodhall (1985) suggest on the basis of what is available that there is more provision at secondary rather than primary level, that it has been declining rather than increasing in the recent past (with some exceptions e.g. Tanzania), and that public subsidies for private institutions vary widely from country to country. Data from Lockheed and Verspoor (1990:20) suggest that primary enrolments in private schools in low income countries declined from about 8% in 1975 to 5% in 1985, and increased from 1% to 14% in lower middle income countries (weighted mean without China and India). These trends may have reversed since the mid 1980s since when conditionality for adjustment has favoured more private schooling.

There is no reliable cross country data on private expenditures on education. This is an important gap in data since private expenditures in publicly funded systems may be substantial and comparable with expenditure per child by the state. Moreover very little is known about how private expenditures behave in relation to public expenditures. It will make a great deal of difference whether or not private expenditures remain a constant proportion of public expenditure as public expenditure increases or declines. Perverse results seem possible (Colclough with Lewin 1993). Where private disposable incomes are declining (which has been the case in many Sub Saharan African countries), the ratio of private to public expenditures may have changed in the direction of reducing private contributions. Even where public expenditure has been increased this may have resulted in a net decline in the total amount of expenditure per child on education. In Malawi, Zaire, and Nigeria there appears to be evidence that the introduction of fees has been accompanied by reductions in school attendance (Stewart 1991a:19-21). Moreover, UNICEF (1984) has argued a 2-3% decline in average incomes can easily result in a 10-15% decline in the incomes of the poorest groups and an even larger reduction in their disposable income. This suggests that where total expenditure declines, and where enrolments drop as a result of increased direct costs of schooling, it is likely to be the children of the poorest families that are most vulnerable to withdrawal from school.

2.5.2. Cost Recovery and User Fees

Some of the issues raised by cost recovery policies are worth exploring further since it seems likely they will continue to figure prominently in the policy debate. They are discussed in Lewin (1987) and summarised here. Charging fees directly to those who benefit from a service rather than indirectly through the taxation system is presumed to have at least two main kinds of benefit - improved accountability and increased resources. Arguably it shortens the chain of accountability between the providing agencies (predominantly schools) and the users of the service. Parents and pupils are expected to value schooling more and place direct pressure on schools and teachers to maintain quality. Fees for educational services may also increase educational expenditure since they represent an addition to public subsidies. Where private schooling is encouraged this reduces the demand on the public system for school places.

There are counter arguments to these presumed benefits. They include the conflict between individual benefit and collective gain, the sophistication of user groups, the impact on participation of charging user fees, and the nature of the service provided at different levels of cost. The mechanism for increased accountability to user groups can be expressed in terms of the benefits parents and pupils hope to obtain from schooling. These reflect the expected returns to individuals in income and social status from schooling and educational qualifications. There is no necessity for this to result in maximising collective welfare; an obvious example is the education of girls which could have considerable impact on child nutrition, infant mortality and population growth, but low apparent rates of return if most women marry early and do not play an active part in the wage economy. Similarly the economic returns to achieving universal literacy for the last to achieve literacy are likely to be low, but the social utility may be high in reducing malnutrition and disease. The kind of conflicts that may arise are described by game theorists as the "tragedy of the commons"- what is in the interests of the individual is not in the interests of the collectivity (Hardin 1968). Enhanced accountability also presumes that parents and pupils can discriminate between high and low quality educational services. Amongst those who have not had significant schooling this seems unlikely; even amongst those who have, the quality of what they themselves received may result in ill informed conclusions concerning the value of different methods of teaching and learning.

As noted above charging user fees is likely to have a disproportionate impact on poor families. Such families generally have more members of school age, have less disposable income and experience greater fluctuations from year to year in income than do rich families. They are more likely to be risk averse in investing in education. Real per capita income in more than half the countries in Africa is less than it was ten years ago. User fees are therefore likely to discourage regular enrolment amongst the poorest and adversely affect the enrolment of girls from poor families where they are in competition for declining family income. It may not only reduce access but also contribute to continued poverty since it will exclude the poorest from job opportunities that require educational qualifications which in all societies are positively correlated with income.

Where user fees are encouraged they may also have an unequal impact on levels of provision. Institutions with relatively wealthy catchments may generate sums substantially in excess of those which they are obliged to recover. This increases the differences between schools in ways which favour the already advantaged. Thus in Shri Lanka, fee income varies widely between schools. In a sample of 252 schools in 1988 37% collected no fees. As many as 78% of the schools that did collect fees averaged less than 10 Rupees per child - less than one third what would have been collected had all pupils paid the full amount. The remainder collected amounts approaching the theoretical maximum. School development society income varied even more widely. Over 46% of schools had no such funds, two thirds of the remaining schools collected about 10 Rupees per child, but five well known schools exceeded 100 Rupees per child (Lewin with Berstecher 1989:65).

These are serious objections which need careful consideration before policy decisions are taken. Several authors (e.g. Meesook 1984, Thobani 1983) have

argued that some of the most detrimental effects of introducing or increasing user fees on the poorest groups can be offset by sliding scales of charges related to levels of family income. However, the practicalities of doing this are daunting. Incomes are difficult to ascertain reliably in most developing countries, the costs of administration may be such as to absorb much of the gain from charging fees (Ainsworth 1984); school staff are ill-equipped to make discriminatory judgements about the wealth of families and unable to enforce payment without encouraging drop-out and souring relationships with parents whose cooperation they need. The political difficulties of introducing fees, whether they are means tested or not, should not be under estimated.

It has been contended that a situation of low user charges and a low level of service may be worse from an equity point of view than one with high user charges and an expanded supply. Thobani (1983) has argued this in his work on Malawi. Where there is excess demand for school places and insufficient public finance some individuals are denied the service and/or quality suffers. The rich suffer least. Services are denied to marginal areas first, selection through examinations into limited numbers of schools correlates positively with the socio-economic background of students. The proposition is that there is an optimal interim level of user charges that maximises the opportunities for expansion and quality improvement at the lower levels (which benefit the poor most) without a significant deterioration in their limited access.

This is a convenient if not very convincing argument that posits equity in a parabolic kind of relationship with user fees rather than as continuous linear variable. It is conceivable that this might hold where supply is greatly restricted and there is great unsatisfied demand and high rates of return for the successful. But it seems equally plausible that demand is not sufficiently inelastic for user fees to have little impact on participation rates, which is a requirement of the model. The supporting evidence offered is that primary enrolment rates (but not secondary) are highest in the north of Malawi (100%) which is the poorest region, and lower in the richer central (52%) and southern (56%) regions. This does indicate that enrolment is not simply a function of wealth. It does not exclude the likely probability that within those regions the poorest groups will decrease their relative proportion of enrolments with the introduction of user fees.

From another study based on Malawi data (Tan, Lee and Mingat 1984) it is clear that progressive increases in school fees are associated with declining expectations of continued enrolment. The proportion likely to continue is higher among students with better educated parents, from high asset owning families, from urban centres, and from more developed areas of the country. Fathers' annual income has a positive effect on continued schooling at all projected levels of fee increase, though its influence appears to diminish at primary level as fees are raised. Willingness to pay increased fees varies directly with socio-economic background in this study. The differences between expected participation rates of high and low asset owning families are closely related to levels of projected fee increase. Studies of this kind have difficulties separating the independent effect of fees on enrolments since they generally only cover one or two years and fee increases may be accompanied by other changes, particularly in economic conditions, that are relevant. Primary school drop-out does not appear to have increased in Malawi between 1981 and 1983 when fees were raised but this may partly reflect a tendency to continue paying for those already enrolled. Secondary fees were increased by 50% and boarding charges by 150% and about 8% of children from low asset backgrounds and only 4% from high asset backgrounds appear to have dropped out as a result. The proportion of low asset families citing increased school fees as the reason for borrowing increased from 50.6% to 72.8% between 1981 and 1983.

A study on Brazil (Behrman and Birdsall 1983), a country with high drop out and repetition rates, has concluded that it may be better to focus on providing better education to a smaller proportion of the age group than to expand provision to reach everyone. If the costs of keeping one child in school for six years are similar to those of keeping three children in school for two years the former is argued to be likely to result in greater net productivity gains. Fees can only have a limited impact on the problem. Birdsall (1982) argues that a doubling of urban school expenditures could be achieved with fee levels at about 5% of the reported monthly income of urban heads of households. In rural schools, where the need to improve quality is greatest, the fee levels that would be necessary are so high that they would not be sustainable by poor families. In the poorest areas only one third of the poorest children attend school whilst nine tenths of the richest do; any fee levying would almost certainly worsen this uneven distribution.

2.5.3 Loans

Loans are another method of transferring costs from the state to individuals. The focus has been on higher education and little emphasis has been given to their use at lower levels. Many countries now operate some form of loan system. Woodhall (1983) identified schemes in 18 Latin American countries, and six in Africa and Asia; by 1992 more than 30 schemes existed (Woodhall 1987:89). Few if any loan programmes appear to be fully financing and it seems unlikely that any can become so in less than 20 years (Psacharopoulos and Woodhall 1985). Loan programmes do work in the sense that they are utilised and that poor students do take advantage of them. However, the Colombian case (Jallade 1974) seems to indicate that they may not be redistributive (since rich students make up the majority of loan takers) and they may serve to channel public finance into private

institutions (private universities benefited from the fees paid through government loans). There are also problems associated with the erosion of the value of repayments by inflation where fixed or zero interest rates are employed; and with defaulters from whom it may not be economic to recover loans through legal sanctions. Loans schemes can transfer significant costs to individuals in the long term, assuming repayment at close to real terms, but such arrangements are politically unpopular, and involve significant start up and administrative costs. It may be that graduate payroll taxes are a better option in many circumstances (Colclough with Lewin 1993).

2.5.4 Some Conclusions

Charging user fees may be equivalent to increasing the level of taxation in the sense that it is a compulsory contribution to revenue. It tends to be different in the sense that it is typically at a flat rate rather than progressive with income. If it is not then its administration becomes very complex. There is therefore a lot to be said for considering first whether there is scope to increase revenue through increases in taxation that are progressive with wealth before introducing substantial user fees. If there is a genuine commitment by the state to educational provision and to increasing equity, then this is probably the preferable strategy. It may be true that parents will part with a greater proportion of their disposable income if they feel they are contributing directly to their childrens' education however it is clear that the methods for achieving this must be carefully considered and that approaches that may be appropriate where there is good infrastructure, real parental choices between schools, and educationally sophisticated parents cannot easily be transferred to locations where these conditions do not apply.

In conclusion this analysis of cost recovery options should not be taken to imply that there is no case to be made for user charges. For higher education the case is very different than at primary level. Living costs as opposed to learning costs can and usually should be transferred on to students and their families. If some schools can mobilise resources derived from their communities they should undoubtedly be encouraged to use the variety of mechanisms available (Bray 1988). Financial regulations should be constructed to reward initiative and simplify procedures so that they are manageable and facilitating. Experience with mechanisms which generate contributions from individuals and communities outside the public budget indicates considerable disparities in the willingness and ability to contribute between communities and these highlight an important limitation. Such approaches are only attractive if they succeed in increasing resources in both an equitable and efficient way.

2.6 Organisational Reforms, Assessment and Alternative Delivery Systems

2.6.1 Organisational Issues

Ways of organising and providing educational services vary widely. The key policy question is which organisational and pedagogical reforms have the most potential to improve internal efficiency without loss in quality. Three preliminary observations provide a starting point.

First, the number of school days is not a constant between countries. For example, in the 23 IEA science study countries (Postlethwaite and Wiley 1991) the number of teaching days in the year for 10 year olds varied from 158 in Ghana to 220 in Korea a variation of nearly 40%. When it is realised that the number of teaching hours a day also varies independently - perhaps by as much as 2:1 - the range of instructional time formally available to students may vary by a factor of two and probably by more (the length of the teaching year in the 23 IEA countries varies between 672 hours (Hungary) and 1134 hours (Nigeria) with a modal value around 950 hours. The teaching loads of teachers are also unevenly distributed in some countries these may exceed 30 hours a week in double shift schools with the majority of this time being spent in contact with children, in others loads of three or four periods a day are common, amounting to about 10 to 15 hours teaching a week. Teacher class ratios span the range from less than one to as much as 2.5:1 in more favoured institutions. The number of non-teaching staff on school payrolls also varies from minimal allocations, to numbers that can be comparable with the number of teachers. These facts suggest that there may be opportunities to increase internal efficiency through changed working practices.

Second, far fewer days may actually be available for teaching than those which are allocated. The actual number of normal teaching days in rural primary schools may be anywhere between 10% and 30% less than the official number. The reasons commonly include:

> loss of teaching days at the beginning of the school year and school terms for registration of new and returning students school refurbishment/cleaning etc.
>
> a week or more for administering public examinations when normal teaching is disrupted (often more in school with secondary grades)
>
> special school events – sports days, school exhibitions, visits by dignitaries
>
> extended public holidays
>
> leave and teacher absenteeism.

Thus the World Bank has estimated that teacher classroom attendances are only 70% of the level they would be if all teachers taught on all teaching days in Shri Lanka (World Bank 1989b). In a recent study of schools in an Autonomous Prefecture in China more

than half the students in senior grades of primary school were found to be absent on days when field workers visited schools (Lewin, Wang et al 1994). Clearly higher teacher attendance coupled with full utilisation of teaching days would significantly increase the hours of instruction available and might reduce the number of teachers needed. It should also improve student achievement assuming there is some relationship between this and the amount of teaching received. Community teachers in the Bangladesh Rural Advancement Committee non formal primary education project have very low absenteeism despite being in poor rural communities. The administrative arrangements are such that unexplained absences result in loss of pay; when absence occurs substitute community teachers are utilised (Lovell and Fatema 1989).

Seasonal absenteeism is common in rural areas during planting and harvest times. The effects of this on learning achievement may be lessened if learning is planned in blocks lasting a few weeks which are complete learning experiences in themselves. Where student absenteeism is high, and reductions in it are unlikely in the short term, curriculum planning which assumes that school experience is not necessarily continuous might therefore bring benefits.

Third, the organisation of teaching and learning typically involves students remaining in whole class groups during all teaching hours. The amount of time spent by students working without direct supervision during school hours is usually small. Where it happens it is more often a product of teacher absenteeism than of design. Yet much useful learning does not depend on the continuous presence of a teacher. Opportunities to exploit peer group learning, self study, and the involvement older children in collaborative learning with younger children, are often under utilised. Practice differs greatly in the extent to which community resources are mobilised to supervise and assist with learning.

Many countries have had experience of projects that seek to enhance access and maintain quality through changes in the organisation of teaching and learning. Project Impact is one of the most well known of these. From its origins in the Philippines and Indonesia derivatives have spread to Malaysia, Jamaica, Liberia and Bangladesh. The project uses self instructional material and peer group learning strategies which include older children teaching younger children. The original goals of Project Impact included increasing student teacher ratios to as much as 150:1. Though it is clear that these projects have had positive outcomes, cost savings have generally been less than originally anticipated. In the Philippines 40% cost savings were projected as a result of fewer teachers and more use of self-instructional materials but did not take materialise. Part of the problem was that those savings which were made produced no financial benefits to the schools. In the Liberian project unit costs for project schools exceeded those for ordinary schools as school size remained too small for economies of scale to become apparent. In Indonesia there were useful cost savings but these were less than initially planned. Materials costs per student were 25% higher than in conventional schools, though this was offset by lower staff costs with the result that overall savings in recurrent unit costs of between 2 and 12 per cent were achieved (Cummings 1986).

The evaluation studies of the Impact projects indicate that learning achievement does not necessarily suffer if reductions are made in the time students spend with teachers provided that self instruction and peer learning opportunities are used as a substitute. There are many other projects which use changes in the organisation and delivery of teaching to reach out of school children. Several of these have succeeded in reducing unit costs by employing educated community members who are given short introductory training courses and are paid at rates below those of government teachers. Two examples of this are the Bangladesh Rural Advancement Committee's non-formal primary education project and the Shiksha Karmi project in Rajasthan. In both of these achievement levels are comparable or better than in government schools in the same areas (Lovell and Fatema 1989, Anandalakshmy 1991). Lewin with Stewart (1991) provide more case study examples of attempts at planned change which vary delivery systems.

2.6.2 Achievement and Automatic Promotion

A further observation is important. Planned learning is defined by curricula goals and evidenced by the achievement of these. Many mass education systems are based on the assumption of linear progression through successive grades where what is taught and learned in one year is extended and deepened at the next. In principle this cumulative model of learning ought to result in higher and higher levels of achievement through the school system. The evidence from achievement studies and from the raw score performance of students in many systems is disquieting. Failure to master large proportions of the curriculum at a given level is widespread and is demonstrated by the fact that significant numbers of students score at levels obtainable by chance on multiple choice tests even after several years of instruction. In the IEA science study the bottom 20% of 14 year old students in Ghana, Nigeria, the Philippines and Zimbabwe scored close to these levels (Postlethwaite and Wiley 1991). It would not be surprising to find similar results at younger ages. Some recent small scale research on mathematics achievement in Shri Lanka seems to suggest that mathematics achievement in a sample of schools at grade 6 and 7 is little better than that in grade 5 when similar test items are administered. Achievement data requires careful interpretation but these kinds of results will not surprise examiners in many countries who are accustomed to performance figures on public examinations which indicate little achievement gain amongst large numbers of candidates. If curricula in successive grades are based on the

assumption of mastery of the lower levels of which many students have at best a poor grasp, then later learning problems are inevitable. Far from being progressive, learning may become more of a cycle of cumulative ignorance where at each level smaller and smaller proportions of what is supposed to be learned have actually been mastered.

In many countries there are subjects which are passed by small proportions of candidates, sometimes as few as 10-20%, after completing an educational cycle. Where the assessment tests are technically well conceived, the problems must reside in a combination of ineffective teaching and unrealistic curriculum goals. In such circumstances it must be attractive to identify curricula goals which are within reach of the majority of children in typical schools with typical teachers. It is then possible to emphasise those learning outcomes that are thought to be essential to all or most of the school population, and to concentrate resources on their achievement. Contrary to popular opinions, curriculum development of this kind, which emphasises mastery of learning goals, does not lower standards. The achieved standards in many school systems are already low and setting goals that are demonstrably unattainable to the majority is often the cause of poor performance. The objection that lowering over ambitious-achievement goals would hamper the level of achievement of the most able students can be countered through the introduction of express promotion streams. This, incidentally, would result in a release of school places that could be made available to those not currently enrolled. Curricula reforms of the kinds suggested are a precondition for successful implementation of automatic promotion. In systems where repetition is high the introduction of automatic promotion is one of the most effective ways of improving internal efficiency and may, incidentally, reduce the propensity to drop out.

2.6.3 Assessment and Examinations

Considerable research has been conducted on examination systems and their impact on teaching and learning. This can only be referred to briefly here. A central theme running through this work is that expressed in the Diploma Disease (Dore 1976), namely that the later a country develops, the more likely educational qualifications will be used as the dominant mechanism to allocate jobs, and that this will have deleterious effects on the quality of education. Learning to do a job may be replaced by learning to get a job. Interest and curiosity may be stifled by the narrow demands to learn for the examination, curricula will only stress that which is examinable, and students teachers and parents will sacrifice inordinate amounts of effort, time and money to maximise their chances of passing examination tasks which may have tenuous relationships with useful life skills. The successful will be blighted by socialisation towards instrumental patterns of motivation and learning for the test alone. The failures will suffer the double jeopardy of being certified incapable and of having experienced an educational diet of little use to them since its form has been determined by the narrow demands of academic selection.

The basic evidence supporting these kind of propositions is widespread. Little's 1978 analysis of IEA data illustrated that the four developing countries (Iran, Chile, Thailand and India) in the sample ranked amongst the first six out of 15 countries on an indication of the frequent use of tests. An analysis of examination papers from most East and West African countries in the early 1980's (ILO/JASPA 1981) showed that the quality of examination papers was very variable, many being unlikely to satisfy technical criteria of reliability and validity. It also illustrated that much that was tested consisted of the recall of information with little emphasis on higher order skills, even in subjects in like science where much curriculum material stressed the acquisition of reasoning skills. A synthesis of studies from five developing countries (Ghana, Mexico, Shri Lanka, China, and Malaysia) showing how assessment practices affected teaching and learning and how patterns of use of educational qualifications in labour markets could result in qualification escalation and inefficient selection practices was provided in Oxenham (ed) 1984. The SLOG project (SLOG 1987) reports the results of a six country study (India, Malaysia, Nigeria, Shri Lanka, Japan and England) which begins to chart the relationships between various types of assessment orientation and the possible negative long term effects of this on interest, motivation, innovativeness and the use of problem solving skills. Expenditure on private tuition in many countries has been rising rapidly sometimes to levels comparable with or greater than public expenditures per child. This is an indication of growing levels of concern with examination success and may have detrimental effects on ordinary schooling (e.g. teacher's putting more time and energy into private tuition activities which generate substantial additional incomes, children studying for 10 or more hours a day).

Little's (1992) updated review of the literature on the Diploma Disease collects together recent work and draws attention to refinements of the arguments which stress that the Diploma Disease is best regarded as a social rather than individual pathology with roots in established educational structures, the level of bureaucratisation in society and the historical depth of social dass divisions. Dore now argues that Japan is likely to retain its economic pre-eminence despite the "examination hell" of schooling in Japan. This is possible, he suggests, because work structures may be sufficient to offset some of the adverse effects of over concentration on examinations. It is also because the Japanese technical and scientific elite have been insulated from the worst effects of examination orientation. Dore nevertheless now condudes that "the chief victims of an examination dominated schooling are likely to be those who are bright without being the brightest, those who are within sight of whatever are socially defined as desirable prizes in the competition

but by no means certain of reaching them without a great deal of anxious effort". Though recent work has not confirmed simple relationships between assessment orientation and work orientations, there does seem to be an association between interest orientations to learning and creativity and problem solving at work (Little and Singh 1992). Moreover it seems possible that different types of assessment practices have differential propensities to facilitate interest orientation, though this remains to be demonstrated on larger samples than have been researched.

The experience of attempts to abandon national examining systems in favour of other methods of selection -as in China during the Cultural Revolution - seems unlikely to provide a way forward for many countries. Unger's (1982) analysis exposes many of the problems that arose during this period. China has returned to a familiar system of national and provincial examining and the "sea of items" has reappeared as a common epithet to describe the experience of secondary schooling. A unified entrance examination for University entrance has been adopted and many of the characteristics of backwash from this into the school system are becoming apparent (Lewin and Wang Lu 1991).

Some promising developments have occurred with the introduction of various forms of school based and continuous assessment which have been introduced partly to lessen stress on public examinations. Pennycuidk (1989:139-152) reviews attempts to introduce continuous assessment in Shri Lanka, Tanzania, Papua New Guinea, Seychelles and Nigeria and finds systems ranging from the total replacement of external exams, to parallel systems of continuous assessment and external exams, and to systems where continuous assessment forms a component of final results, together with external examination results. The much greater involvement of teachers in the assessment of students in these systems is obvious. But there has been a wealth of difference between the systems planned operation and the practice in reality as the Nigerian experience illustrates. Nwakoby (1988) highlights major problem areas which include inadequate conceptualisation by teachers, doubtful validity of assessment, and inadequate structural and administrative support. Attempts to introduce continuous assessment schemes in some countries have floundered in the face of practical problems and the opposition of groups who see few real benefits emerging and much extra work (e.g. Shri Lanka). In other cases complete dependence on school-based examining moderated by national rating examinations has been replaced by a mixed system that cumulates internal and external examination scores together (Papua New Guinea). There is some suggestive evidence from Papua New Guinea that schools where correlations between internal assessment and the external rating examination are lower, (Ross 1992 cited in Lewin 1992:110) perform better than those where the correlations are high. It is most likely that examination orientation is least where the correlation is lowest and internal tests measure a different range of outcomes to external assessment.

A number of countries have begun to develop their capacity to analyse performance on examinations and feed insights from this back into the school system. Somerset's work in Kenya in the early 1980's is a well known example of this (Somerset 1982). The Examination department in Papua New Guinea issues comprehensive analyses of examination performance to schools which provide indications of which areas students performance is weakest. This kind of data, both on school performance as a whole, and on individual item response patterns, is a potentially invaluable source of data for planning and intervention decisions. The problem is generally either that the data collection and analysis system is unable to provide such information in countries where infrastructure is weak, or that very limited use is made of the information since its distribution is restricted and its presentation too technical for many of those with access to it. A recent paper by Eisemon (1990) explores examination policies to strengthen primary schooling in African countries.

A new analysis of science examination data in Malaysia (Lewin and Sharifah Maimunah 1994) illustrates how new insights can emerge from reanalysing examination data. In this study some science items were identified which were relatively easier for rural students despite the fact that there mean scores were well below the national average. Under performance of rural students therefore appears to be concentrated in particular areas of the science curriculum and it is teaching and learning in these that invites intervention strategies, rather than in all areas of the science curriculum. Similarly analysis of the performance of a sample of girls with similar overall scores to those of boys showed that scores were being achieved in different ways - some areas appeared easier for girls and others considerably more difficult. This suggests girls performance could be improved by attention to learning problems in a few specific areas of science. The research also shed light on another possible aspect of the over emphasis on examination results. There appear to be different strategies employed by schools to attract public recognition. In some overall pass rates are stressed, in others the proportion of the highest scoring students who gain the top grades is of most concern. The former approach may lead to the relative neglect of high achieving students, the latter to too much stress on the most able at the expense of other students.

In countries which have centralised examining systems where there is considerable emphasis on examination results improvements in the quality and content of assessment instruments are attractive for three main reasons. First examination reform may be the most cost effective way to change patterns of teaching and learning within the limitations of what can imaginatively be examined. Second, improvements in the quality, relevance and technical adequacy of selection

examinations is likely to be a priority. If these conditions are not met then those who are selected may not be either fairly identified or the best suited for the jobs or further courses to which they have been chosen. Third, research on examination performance at regional, school and individual level is a critical element in understanding the effects of previous policy reform on achievement and in making decisions designed to lead to further improvements in access, equity and the outcomes of schooling.

2.6.4 Alternative Delivery Strategies

Though much has been written about the prospects for enrolling more students outside conventional formal school systems there is only patchy evidence on the experience of this. Non-formal and out-of-school programmes are notoriously difficult to cost and evaluate. Their forms are very varied, sources of support may be extremely diverse and of uncertain value, successful completion rates and achievement data are often unavailable, the programmes themselves are often transient, and target groups are often not clearly defined. Studies which have tried to compare the cost effectiveness of adult education have run into irresolvable problems arising from these factors (e.g. Carr-Hill and Lintott 1985).

There is some evidence on cost-effectiveness relating to systems that have adopted various forms of distance learning, another widely promoted alternative delivery system. These most commonly include multimedia open university systems, correspondence colleges and radio learning. In most cases these have not supplanted the formal systems that exist alongside them, rather they are complementary, satisfying demand that cannot be met through existing institutions. Sixteen distance teaching projects, about half of which are at tertiary level, are reviewed in Perraton (ed) 1986. Open University programmes seem to have lower costs per graduate than conventional enrolments, though there are almost as many cases where costs are thought to be comparable with some existing institutions. Amongst the secondary level programmes reviewed, several are more expensive per completed graduate than normal schools, although the majority appear to be cheaper. Completion rates are crucial to these calculations, yet these are often not easy to discover. It can be concluded that well designed and effectively implemented distance learning can offer lower unit costs. This can allow greater access to secondary and post-secondary courses but has little or no impact on the resources available for primary schools.

Studies of out of school learning indicate that there are a wide range of methods through which young learners can acquire useful knowledge. There are many ad hoc arrangements of the informal apprenticeship variety and many countries have institutionalised various community based education programmes that, to a greater or lesser extent, shadow the formal system (Lewin and Jones 1985). These are rarely given high priority by governments coping with severe underfunding of the formal system, since they have less political visibility. Employers may also be wary of supporting out of school schemes unless they have some guarantee that those trained through them will use their skills within the enterprise that sponsors them. Where skills are job specific these kind of schemes seem to be most successful. There is considerable unsatisfied demand for sources of knowledge outside the formal school system and much potential in exploring the best vectors through which this can be delivered. As with distance education, these opportunities are most widespread at the post-primary level.

There are examples of successful alternative delivery systems. The Bangladesh Rural Advancement Committee (BRAC) has organised a non-formal primary education programme since 1985. This focuses on children who have been deprived of access to normal primary schools as a result of poverty and particularly encourages girls to enrol. In 1989 2,500 schools were functioning and a further 2000 were planned (Lovell and Fatema 1989:32). By 1992 the number had risen to 6,200 schools (Lovell 1992:50). These schools offer a three year programme for 8 to 10 year olds and a two year programme for 11 to 14 year olds and are completely free.

Teachers for these schools are recruited from local communities and given 12 days initial training followed by monthly training sessions. They are paid a stipend of about US$ 10 month (1989) which is about one third of that for a government teacher. Preliminary evaluations (Lovell and Fatema 1989) suggest that the cost per student is about US$ 15 per year, excluding the contributions that communities make to the maintenance of the classroom facilities and any opportunity costs arising from school attendance. The programme is supported by four international donors and BRACs own resources. The drop out of students appears to be very low (1 to 2%) and a very high proportion of those following the programme for 8 to 10 year olds (95%) are entering grade 4 of government secondary schools. Evidence on achievement levels suggests that these are comparable with those of students in government schools. BRAC has also been involved in a facilitation assistance programme to upgrade government primary schools in four districts. Here improvements have occurred but drop-out and absenteeism remain much higher than in BRAC schools and pedagogical changes have been much more difficult to introduce (Lovell 1992:57). The BRAC experience seems to illustrate that it is possible for alternative systems to work effectively at low cost with students who would not otherwise be enrolled. It remains the case that BRAC schools are not replacing normal provision, but successfully supplementing it for groups to whom it has not been available.

2.7 Literacy

Mass literacy has long been argued to be a necessary but not sufficient condition for sustained development to take place and there is an extensive literature on

the problems of increasing literacy rates. Bhola (1990) lists 46 books on literacy published between 1980 and 1989. The world now has almost one billion adult illiterates and over 95% of these are to be found in developing countries. Disproportionate numbers of illiterates are female, from poor households, and members of minority groups within their own countries. In absolute numbers China and India have the most illiterates as a result of their very large populations. Profiles of illiteracy rates by age group and sex have proved slow to change over time though overall levels of literacy have improved considerably.

Table 6 Estimated Adult Literacy Rates by Sex 1970-2000 (percentages)

	Male				Female				Total			
	1970	1985	1990	2000	1970	1985	1990	2000	1970	1985	1990	2000
World	69.6	78.1	80.6	84.6	53.5	63.1	66.4	71.8	61.5	70.6	73.5	78.2
Developing Countries	57.8	71.1	74.9	80.3	32.6	49.9	55.0	63.2	45.3	60.7	65.1	71.9
Sub Saharan Africa	32.5	52.6	59.0	70.2	13.2	29.5	36.1	49.6	22.6	40.8	47.3	59.7
Arab States	39.5	59.2	64.3	73.1	13.7	31.5	38.0	50.6	26.5	45.5	51.3	62.0
Latin America/Caribbean	77.5	84.3	86.4	89.7	70.1	80.3	83.0	87.3	73.8	82.3	84.7	88.5
Eastern Asia	67.3	82.0	85.7	90.0	38.7	60.7	66.4	75.4	53.2	71.5	76.2	82.8
Southern Asia	44.8	55.6	59.1	66.2	16.9	27.9	32.2	41.2	31.3	42.2	46.1	54.1
Least Developed Countries	31.9	46.3	51.4	60.8	13.0	25.4	27.9	37.3	22.5	34.8	39.6	49.0

Source: UNESCO World Education Report 1991:97

Literacy rates are highest in Latin America, the Caribbean and East Asia, and lowest in Sub Saharan Africa, the Arab States and Southern Asia. Improvements in the latter group appear to have been slowest in Southern Asia. Gender disparities remain striking in all regions except Latin America and the Caribbean. The literacy gap between men and women (the differences in the proportion literate) appears to have remained the same or reduced in all regions except Sub-Saharan Africa. In 1990 UNESCO estimates that there were 920 million illiterates in the developing world compared to 840 million in 1970. The absolute number of illiterates has increased significantly in Sub-Saharan Africa, the Arab States, and Southern Asia over this period, though they represent a diminishing proportion of the total population.

Wagner (1990) argues that if current trends continue illiteracy is likely to continue to diminish. UNESCO projections anticipate that overall literacy rates will improve from 65% to 72% in developing countries between 1990 and 2000. Southern Asia will remain with the lowest average (54%), marginally above that projected for the least developed countries (49%). Though in some areas literacy rates may dedine as a result of the dislocations of war or economic collapse, there is no evidence that this is likely to be a general trend.

2.7.1 Definitional Issues

The recent World Conference on Education for All called for reductions in the adult literacy levels to one half of the existing values. UNESCO's definition of functional literacy is that

> **"A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his (sic) group and community and also for enabling him to continue to use reading, writing and calculation for his own and the community's development."**

There remain problems in translating this and similar definitions into practice. Two principal methods have been advocated: self assessment (e.g. through census questions) and the use of standardised literacy tests. Indirect self assessment methods carry a high risk of error and over reporting, particularly when carried out using untrained interviewers. In many surveys the ability to read aloud from newspapers is used as a criterion though this may not indicate comprehension. Others use the ability of the respondent to write their names as the criteria. Some assessments include basic numeracy as an integral part, but practice on this is inconsistent. At the most unreliable level respondents are asked "Can you read and write? with no capability to test the veracity of the response or differentiate levels of facility. Literacy may be defined in a mother tongue or in a national language and this is likely to affect the number of illiterates identified. Direct methods that involve standardised testing are expensive to administer and also suffer from problems of reliability and validity. Wagner (1990) proposes a new approach to assessment which employs both direct and indirect measures of literacy, attempts to differentiate levels of facility, and recognises the context in which literacy is acquired and used.

UNESCO has developed a series of concepts which illustrate some of the shifting approaches that have been employed in literacy projects. These include fundamental education, community development, universal literacy, work orientated literacy and cultural literacy. However according to Jones (1990) none of these have stayed in place long enough to have acquired an adequate theoretical grounding. In reality many of the assertions made in the literature about relationships between literacy and development are hypotheses for which there may be circumstantial evidence but no rigorous justification. While it is generally accepted that literacy is a necessary condition for access to ideas from the wider world and that "modernisation" in attitudes and dispositions is closely associated with the possession of literacy, more specific relationships have proved difficult to unravel. This is partly because literacy is a social construction and is significant in determining, and being determined by, the prevailing social order (Oxenham 1980). It is being increasingly recognised that literacy is a relative construct and is in practice context dependent. Global definitions therefore appear both elusive and unattainable (Wmchester (1990). The implication is that literacy programmes need clear objectives that are grounded in different socio-economic contexts and that criteria for improvement are unlikely to be universal, or if they are they will be at the lowest level of cross cultural generalisation.

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2.7.2. Literacy and Development

Literacy for liberation and empowerment was the prevailing theme of much research and intervention with literacy programmes over the last decade (Freire and Macedo, 1987). From this perspective literacy is an important trigger for social emancipation. Some of these ideas were echoed in a recent seminar (Commonwealth Institute, 1990) which viewed literacy programmes within non-formal interventions designed to culturalise, liberate and empower the deprived. Some commentators have reservations about the possible unwanted consequences of literacy (Wmchester 1990). Governments frequently wish to remain in control of non-formal initiatives that may challenge the role of the state in distributing resources. Empowerment may lead to direct conflict between the relatively powerless and the powerful. Marshall's (1990) participant observation of literacy training in a Mozambican factory reports that ordinary worker's fear and experience of subordination encouraged them to regard literacy as a means of altering their positions in the power hierarchy. Their expectations were based on what it appeared to have done for others in the factory. Her study pieces together how literacy was linked in with other interlocking structures for distributing power and influence - gender, race and class. Mukhapadyaya (1990) reports on a literacy programme targeted at squatters in Calcutta which employed local animateurs to promote the need for literacy to gain self respect. The purpose was to counter balance preconceptions that literacy alone would resolve problems of hierarchy and social stratification.

The situation of women and girls appears particularly serious. Despite the many studies that imply attractive developmental gains from providing more education (and thus improving literacy rates) substantial gaps in literacy rates persist. This is especially so where overall enrolment rates are low. Stromquist (1990) argues that this continues to reflect dominant power relations in most societies. She argues that most literacy programmes for women are organised within stereotyped roles with patriarchal ideologies determining access as well as content and achievement levels. She puts the case that women's literacy programmes should put mare emphasis on income generation, nutrition, health, family planning and on raising consciousness so that " the process of becoming literate must be as important for women as the end result of being literate" (Stromquist 1990:108).

Several studies indicate that correlations exist between GNP per capita and literacy rates but these cannot readily demonstrate the direction of causality. Kahn' (1991) in a recent study in Pakistan argues that there is a large effect of literacy on productivity in manufacturing but not in agriculture. This is in contrast to the many studies which indicate a relationship between additional years of schooling (and by implication higher levels of literacy) and agricultural productivity (e.g. Jamison, Lau and Lockheed (1992)). Lomperis (1991) shows that maternal literacy in Colombia is associated with the nutritional status of pre-school children. Ross (1990) describes a remedial reading programme in Malaysia which aimed to promote parental involvement in children's reading. In this it was found that even those mothers who were illiterate could be encouraged to play an active and influential role in children's learning through the production of learning materials and workshops on children's motivation. Eisemon and Nyamete (1990) explored the relationship between school acquired literacy and agricultural innovation in Kenya. This seems to indicate that while schooling and literacy promotes awareness of the importance of new inputs and techniques, the capacity to make use of these is also dependent on understanding of science and technological principles and procedures.

2.7.3. Literacy and Language

The debate about which language to use as the medium of instruction for literacy for adults and school children is widespread and unresolved. In many developing countries practical considerations have weighed in favour of adopting an official language of a majority group or of a former colonial power. Yet to be fully literate in many societies, for example Nigeria, might require literacy in the national language, a regional language and a local one. There is some evidence that children who acquire literacy in their own mother tongue are better able to transfer these skills to other languages than when literacy is acquired first in another language though counter examples are also cited by Wagner, Spratt and Ezzaki (1989). Delpit's (1984) review of six countries suggests that mother tongue instruction in the early years of schooling had positive effects on achievement in four of the cases. Tokples preschools in Papua New Guinea which use vernacular languages have been extensively evaluated Ross (1989). All of these studies support the view that vernacular pre-schools help in the subsequent acquisition of English. Mother tongue policies for pre-school and the early years of primary often meet with resistance from interest groups. Cossio (1991) suggests that attempts to move in this direction in Ecuador were thwarted by those who wished to retain Spanish. Rubagumya (1991) argues that despite attempts to promote Kiswahili in Tanzanian primary schools and in adult education as the medium of instruction the position of the language is still precarious at secondary and higher levels. Okedara and Okedara (1992) review mother tongue instruction in Nigeria and note the lack of adequate orthographies for many of the languages and the limitations to literacy until these have been developed.

2.7.4. Strategies to Promote Literacy

Three main strategies have been followed to promote literacy. These are mass literacy campaigns, strategies that integrate primary education with adult literacy programmes and selective literacy campaigns with a

particular focus. Each approach places differing emphasis on self reliance, self motivation and the quality of instruction (Bhola 1990).

Mass literacy campaigns are reviewed by Torres (1990), Al-Nasser (1990) and Sasaoka (1990). The most successful campaigns appear to have been those conducted in socialist countries though reservations are expressed about the validity of the evaluations and the durability of the outcomes achieved. Tanzania claimed to have reduced illiteracy from 67% to 21% between 1971 and 1981 using an approach based on self reliance and socialist principles. Nicaragua mobilised 80,000 volunteers and used an approach based on concientisation based on local popular organisations. Ethiopia employed 250,000 volunteers in 1979 to reach 11.5 million illiterates and claimed to have increased literacy from 7% to 45% over eight years. Okedara and Okedara (1992) have evaluate mass efforts in Nigeria and conclude that the results have been compromised by inadequate funding, sporadic activity and lack of materials and are circumspect about the confidence that can be placed in the success of the programmes. Little systematic data exists and it is rarely possible to decide whether literacy rapidly acquired is retained subsequently. Their methodological critiques apply to the claims made by other mass literacy campaigns which are usually heavily politically promoted and in which accurate reporting may be compromised by over enthusiastic attempts to meet ambitious targets.

Bordia and Kaul (1992) describe the Indian National Literacy Mission which involved inputs to primary and adult education in an integrated framework. Evaluation studies suggested that success levels were associated with programme duration, the relevance of course content, and the visibility of results to participants. They conclude

> " We cannot always hold out the promise of a better future for literate people for the simple reason that mass education is not accompanied by redistributive justice and a dismantling of age-old social, economic and political power structures. If, therefore, young people in India are to pursue their literacy courses to a satisfactory level it has to be out of respect for learning, an assertion of personal will, and a motivational environment created by mass mobilisation" (Bordia and Kaul 1992:161).

The Regional Programme for the Eradication of Illiteracy in Africa launched in 1984 urged member states to eliminate illiteracy through a vigorously sustained two pronged campaign to universalise primary education and promote literacy for young people and adults (UNESCO 1984). The Major Project (Proyecto Principal) established in Latin America in the 1980's had similar objectives (Torres 1990). Other examples include The Arab Literacy Strategy (Al-Nasser 1990) and the Literacy Awareness Programme in Papua New Guinea (PNG 1991).

Examples of selective literacy campaigns include the Literacy for Income Generation Program for Women in Togo, Employment Orientated Learning in Indonesia, the Skill Training Program in Jamaica, the Small Farmers Development Project in Nepal, and the Training of Local Self Help Leaders in Burkina Faso. All of these take a narrower specification of both target groups and desirable outcomes than is common in the other approaches. Literacy is often linked to particular needs for skill generation and income earning.

Although much has been invested in literacy campaigns even less is known of their cost effectiveness than for most other aspects of educational investment. Cairns (1989) has reviewed what can be learnt from experience so far and highlights problems arising from lack of political will, over ambitious targets, poor administration and delivery, and the lack of detailed planning. He argues that there have been too few needs assessment studies, too much emphasis on the supply side of the problem, and ignorance of the technical aspects of the curriculum development of literacy materials.

The quality of literacy materials has been explored by Eisemon et al (1992) who stress the need to develop the kind of texts which have a value in everyday life. Research in Kenya based on understanding commercial medicine labels illustrates a gap between the skills taught and those necessary for comprehension of common instructions. The Adult Literacy Programme in Papua New Guinea has also suffered from a lack of suitably designed materials relevant to daily life (PNG 1991:143). Rodriguez has compiled an inventory of literacy teaching methods for Latin America and Vargas has provided a bibliography of post-literacy materials (both cited in Roca 1989). The curriculum development problems are linked to understanding of changes in the role of facilitators. Literacy which is aimed at empowerment requires a different set of skills than other more traditional approaches. Facilitators need to be intimately familiar with context, share to some extent the problems of participants, and be able to work with a participatory approach that arguably is not teacher centred (Commonwealth Institute 1991). Psychological insight and socio-political skills may as important as pedagogical skills in this approach.

The importance of post-literacy training has been stressed by many commentators (International Review of Education 35(4), 1989). Examples of such programmes are widespread, e.g. in China, India, Thailand, and these demonstrate the need for continuity and support to sustain literacy gains (Ahmed 1989). Easton (1989) draws attention to the needs for ensuring adequate opportunities for the application of new literacy skills. Lasway (1989) outlines the impact of post-literacy programmes in Tanzania and reports that these programmes have helped to increase income, improve health and nutrition practices, and have enhanced participation in local affairs.

NGO's have had a long and active role in coordinating adult literacy activities. The International Council for Adult Education has over 100 members from over 85 countries. The International Task Force on Literacy (ITFL) is a new coalition of NGO's. Hall (1989) has reviewed the activities of NGO's in Shri Lanka and Bangladesh and Rivero (1989) has explored NGO's contributions to post literacy programmes in Latin America. NGO's can have important advantages over official organisations in coordinating action, mobilising large numbers of volunteers and making good use of scarce resources. They may also be linked to popular movements which have overt or covert political agendas and they may therefore fall under the suspicion of governments. Freire has argued that some programme goals were compromised in Guinea-Bissau, Sao Tome and Nicaragua (Lind and Johnston 1986) as a result. On the other hand government sponsored schemes may not capture the imagination of the people, especially where serious commitment to improve the conditions of illiterate and marginalised groups does not exist, and may suffer from indifference on the part of those they attempt to help.

2.7.5 Concluding Remarks.

Simple conclusions concerning literacy campaigns are difficult to reach since the experience is so varied. From the above we can distil several observations.

First, with regard to the sustainability of literacy interventions mass adult literacy campaigns appear to be expensive if continued for any length of time. If they are continued it becomes difficult to maintain political will and high levels of resource mobilisation. Campaigns, which integrate primary education and adult literacy interventions seem more likely to include provision for post-literacy activity and be based on bottom up rather than top down pedagogic philosophies which make use of curriculum materials based on living skills. In these campaigns socio-political and psychological training is often argued as being as important as pedagogic training. Selective interventions have the advantage that they can be tailored more closely to the needs of particular groups. They may benefit from the ability to demonstrate valued outcomes more clearly than other approaches.

Second, cost effectiveness benefits from the deployment of voluntary workers who are well motivated. If political will can be sustained and imagination captured and directed towards achievable goals, costs are likely to be lower than with other modes of delivery. NGO's may be especially suited to this kind of mobilisation. Even illiterate parents can act as volunteers working with their children on common tasks. Where a high proportion of voluntary support is mobilised there remains a need for appropriately trained facilitators and for some material inputs that are otherwise likely to be unavailable e.g. printed materials.

Third, external assistance may need careful targeting on those areas where resource needs are most acute and where some comparative advantage lays. This may be most likely in relation to the technical skills of curriculum design and development, the production of literacy materials, and aspects of teacher/facilitator training. The danger exists that donor emphasis on supply side problems undervalues the importance of understanding effective demand for literacy and ensuring that investment in programme materials does not neglect the need for complementary action to motivate illiterates to become literate. Programmes that integrate a variety of development concerns (health, shelter, environment, employment) may encourage the perception of a range of benefits associated with the acquisition of literacy. External assistance seems most appropriate where there is already in place a locally developed strategy with political support and community involvement with some evidence of small scale success.

Fourth, special emphasis on the needs of women and other marginalised groups should remain a feature of literacy interventions. This is as true at the post-literacy level as for initial literacy. The benefits associated with raised literacy amongst women are extensive and are likely to have an impact on the level of literacy of children. Disproportionate numbers of illiterates are concentrated amongst marginalised groups and this often places them at a disadvantage in gaining access to support services that can raise incomes and alleviate poverty.

3. POSTSCRIPT

This review has discussed the key issues that will shape the debates on education and development into the twenty first century. Recession, debt and structural adjustment programmes will continue to constrain resources for human resource development in the poorest countries. Demographic trends provide the underlying determinants of educational demand in the long term and the growth of HIV sero prevalence is likely to require radical appraisals of how existing projections may need to be modified. Technological change will continue to fuel development and require changes in patterns of employment and livelihoods which are likely to become more rather than less dependent on basic understanding of science and technology. The educational aspects of environmental protection and sustainable development will become more important as renewable resources become scarcer and the environmental burden of economic development becomes clearer. New definitions of development increasingly include priorities attached to human rights and good government as an integral part of the meaning of development. Finally gender discrimination will remain a high priority for action through educational assistance since it is here that the greatest gains to investment in education can often be demonstrated.

The review examines recent thinking in seven areas which relate directly to the evidence available on the

effects investment in education may have on development. The complexities of analysis of economic benefits of human capital development have been discussed emphasising the need to consider these at the micro and meso level as well as at the macro level before using them as a guide to policy. The literature on school effectiveness and student achievement has been critically reviewed to indicate what can and cannot be concluded from available studies. The arguments that surround further investment in technical and vocational education have been unpacked and some common features of worthwhile interventions identified. A perspective has been offered on judgments concerning the balance of investment between educational levels. The risks and benefits of more reliance on private educational expenditure and cost recovery programmes have been separated out. Insights into organisational reforms, assessment practices and alternative delivery strategies have been used to emphasise that education and development issues are intimately bound to working practices, learning tasks and teaching methods in educational institutions. Finally, the problems which are associated with different aspects of literacy programmes have been described and some conclusions drawn.

It has proved a daunting task to assemble a cogent review from what is now a very extensive literature. Each section of this paper identifies many of the most important recent contributions to thinking in the respective fields and stands as a basis for deeper reflection in relation to specific issues in particular country contexts. Each section also provides the basis for the development of strategic thinking on where assistance for educational investment can make the greatest impact on the achievement of development goals.

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APPENDIX

Extracts from Synthetic Reviews

A. Summary: School Factors and Achievement in the Developing World

School quality indicator	Expected direction of relationship	Total number of analyses	Number of analyses confirming effect
School Expenditures			
1. Expenditure per pupil	+	11	6
2. Total school expenditures	+	5	2
Specific Material Inputs			
3. Class size		21	5
4. School size	+	9	4
5. Instructional materials			
Texts and reading materials	+	24	16
Desks	+	3	3
6. Instructional media [radio]	+	3	3
7. School building quality	+	3	2
8. Library size and activity	+	18	15
9. Science laboratories	+	11	4
10. Nutrition & feeding programs	+	6	5
Teacher Quality			
11. Teacher's length of schooling			
Total years of teacher's schooling	+	26	12
Years of tertiary & teacher training	+	31	22
12. In-service teacher training	-	6	5
13. Teacher's length of experience	+	23	10
14. Teacher's verbal proficiency	+	2	2
15. Teacher's salary level	+	14	5
16. Teacher's social class background	+	10	7
17. School's percentage of full-time teachers	+	2	1
18. Teacher's punctuality & (low) absenteeism	+	2	0
Teaching Practices/Classroom Organisation			
19. Length of instructional program	+	14	12
20. Homework frequency	+	8	6
21. Active learning by students	+	3	1
22. Teacher's expectations of pupil performance	+	3	3
23. Teacher's time spent on class preparation	+	5	4
School Management			
24. Quality of principal	+	7	4
25. Multiple shifts of classes each day	-	3	1
26. Student boarding	+	4	3
27. Student repetition of grade	+	5	1

Source: Fuller B. What School Factors Raise Achievement in the Third World. Review of Educational Research, Vol 57(3), 255-292,1987

B: General Education and Development Research Review

Year	Reference	Data	Findings
School Effects			
1987	Fuller	review	variety of school inputs do contribute to achievement
1987	Lockheed & Hanushek	*review*	radio and text-books more cost-effective than teacher training; academic more cost-effective than vocational education
1983	Heyneman & Loxley	IEA database	larger effect of school factors in low income countries
1986	Armitage et al	student Survey Brazil	teacher quality and materials have significant effect on achievement in rural areas
1984	Loxley	Botswana students	school effects on reading and maths greater than family effects; teacher training and library resources important
Sector Management			
1983	Heyneman & Loxley	Egypt-primary	students perform better with principals who had attended more training courses
1986	Figueroa	Mexico-primary	differences in management style, curriculum and classroom organisation between public and private schools
1987	Fuller	several school quality studies including management variables	headmaster education and experience have positive effect on achievement
Educational Technology			
1982	Clearing House on Development Communication	Niger Teacher Training	high cost of TV but reduced dropout
1985	Kulik et al	Review	computer-assisted instruction has positive effect in primary
1986	Carnoy et al	Review	many developing countries are investing in computer literacy programmes but no research basis for doing so
1986	Oxford et al	Radio-Kenya	helped elementary students perform better in listening and reading
1986	Walker	Radio-Dorninican Republic	low-cost and cost-effective relative to traditional inputs [preliminary findings]
1987	Anzalone	Review	radio when properly used is cost effective; TV expensive and contributes little to achievement
1987	Freeman	Grenada	use of computers significantly disturbed by poor electrical supply
1987	Williams	Trinidad & Tobago	within schools females had greater access; outside school males had

Vocational and Academic Secondary Education

1982	Schiefelbein & Fartel	8th grade Chilean students	tracking into vocational curricula where academic achievement is not emphasised will lower student achievement
1983	Hinchliffe	Tanzania	higher annual unit recurrent costs for al education compared to academic
1985	Cummings et al	Kenya	staffing and capital costs higher for industrial subjects
1985	Lee	South Korea secondary graduates	in-plant vocational training is more effective than training in vocational schools
1985	Metcalf	Review of studies	Rate of return to vocational training high enough to justify investment
1985	Psacharopoulos & Loxley	follow-up survey of secondary graduates in Columbia & Tanzania	no labour advantage to graduates of vocational courses
1986	Tibi	Thailand	recurrent costs in agriculture and technical colleges higher than in professional colleges
1987	Chung	Hong Kong census	returns to vocational and technical education higher than to general education but significant only for rapidly growing electrical and commercial sectors
1987	Komenan	Ivory Coast labour survey	Technical education has higher payoff than general education but costs are higher at secondary level
1987	Min & Tsang	Worker Survey in Beijing	productivity of vocational and technical education higher than for those with general secondary [auto industry]
1988	Chin-Aleong	Labour force in Trinidad & Tobago	specialised craft students found jobs more quickly than did academic students
1988	Grootaert	Ivory Coast Living Standards	social rates of return are low to vocational and technical education but higher at post secondary levels compared to post-primary
1988	Moock & Bellew	Peru Living Standards Survey	returns similar to vocational and technical education and academic graduates except for self-employed
1988	Noah & Middleton	secondary data from China	need to shift away from apprenticeship vocational and technical education to in school vocational and technical education
1988	Psacharopoulos	Six firms in Peru	higher rate of return for short vocational and technical education courses

Education and the Environment

1983	United Nations	Data from world fertility survey of 22 developing countries	Differential fertility highest in countries with highest levels of development; confirms negative influence of education on fertility
1984	Zachariah & Patel	Fertility decline in India	socioeconomic factors influence family planning practices

Financing Education

1983	Woodhall	secondary data on student loans	student loans available in 30 countries; programs appear successful
1984	Tan et al	Malawi	user fees will have small effect on enrolment; large for low income families
1985	Schiefelbein	private and public schools in Chile	private schools achieve more even when social factors controlled
1986	Jiminez	private and public schools in Bolivia and Paraguay	private schools achieve more even through unit costs are lower
1986	Mingat & Tan	university student	simulation of student loan repayment suggest some recuperation of public costs particularly in Asia and LA
1986	World Bank	Review	cost-recovery and fee-based private education have small negative impact on attendance; possible positive impact on equity in school spending
1987	Jiminez	household survey data	average enrolment might remain stable if fees increase: effects depend on income group
1987	Psacharopoulos	Colombian and Tanzania students	cost of private schooling lower; mixed results for achievement
1988	Gustafsson	Botswana and Zambia	school production units not an important cost factor
1988	Jiminez et al	students and teachers in Thailand	private school students perform better and are more cost-effective

Source: Haddad, W, Carnoy, M, Rinaldi, R, and Regel, O, Education and Development: evidence for new priorities, World Bank Discussion Papers, No 95, The World Bank, Washington, 1991

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